THE IRON TRADE REVIEW

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Pending Car Orders Make a Very Large Total

And Builders Are Obtaining Higher Prices—Pittsburgh Steel Company Buys Basic—Sound Statistical Position of Pig Iron

Heavy specifying against contracts ending with the year is an important feature of the present activities. The decrease in buying, always expected as the inventory period approaches, is being experienced to some extent in nearly all centers, but the leading producers in the Chicago district report tonnages of both specifications and new business almost as great as during November, which was one of the four busiest months of the year.

Pig Iron

The strength of underlying conditions is shown in a very impressive manner by the statistics of the Eastern Pig Iron Association, which disclose that the furnaces have orders practically up to their capacity for months ahead, while the total bookings of eastern Pennsylvania merchant furnaces Dec. 1 were ten times the tonnage of stocks on hand. Similar statistics are not available for all districts of the country, but so far as known, sellers occupy a very strong position. The market is naturally quiet at present and it is not probable that there will be much activity before January, when buying for the third quarter and last half of next year will probably begin in earnest. Up to the present time, very little interest has been shown in the market for delivery after July 1, 1913, and the largest transaction reported is the purchase by a New York state company of 7,000 tons of forge iron for delivery in the third quarter of 1913 by makers in that state. In the Pittsburgh district, some of the heavy buyers are negotiating for Bessemer and basic, and it is understood that one Pittsburgh company has purchased 35,000 tons of basic for delivery during the next six months, principally by Youngstown companies, at about $17.00, valley, for prompt, and $16.35, for later delivery, while another company has purchased 1,000 tons of prompt basic at $17, valley, the highest price paid for several years. Prices of southern iron vary to a large extent in different districts, but in most markets no difficulty is experienced in obtaining iron for prompt shipment at $13.50, Birmingham, for No. 2.

Coke

Increased demand for furnace coke for the first six months of 1913 has developed. Some consumers in the Pittsburgh district are in the market for additional tonnage and several blast furnace companies are figuring on their full requirements for the half year. A Buffalo interest is figuring on 12,000 tons a month for the first half. Furnaces in the Chicago and Cleveland districts are also in the market. The present outlook is that the production of coke for the year will compare favorably with any year since 1907.

Shapes and Plates

Structural orders in the New York district during the week amounted to about 15,000 tons, including 5,500 to 6,000 tons for the Consolidated Gas building, awarded to Milliken Bros., Inc., and from 3,000 to 4,000 tons for the Cotton Exchange, to be furnished by the American Bridge Co., which has also taken 1,100 tons for the Stewart department store, in Baltimore. Levering & Gerrigues will furnish 2,200 tons for the American Express building, New York. Contracts in the Chicago district amounted to about 5,500 tons, including 1,600 tons for the Carter Harrison school, awarded to the South Halsted Street Iron Works, and 1,100 tons for the Chicago avenue bridge, awarded to the Toledo Bridge & Crane Co. Eastern Pennsylvania plate makers are enjoying a very large business, on a considerable part of which high premiums are being paid. Some plate mills report that specifying is not as heavy as it was a few weeks ago.

Railroad Buying

Car builders are now obtaining about 33 per cent more for cars than were paid by the railroads during the period of depression, about a year ago, when prices were extremely low. Much activity continues to be shown in the car market and an accurate compilation shows pending inquiries reach about 50,000. The closing of a number of large orders during the past week is reported. The Missouri, Kansas & Texas has placed 4,000 box cars and the Rock Island 2,250, with the builders in the Chicago district. The Illinois Central has also ordered 4,500 miscellaneous cars, and the Monon has awarded 1,000 coal cars, understood to have gone to Haskell & Barker. The Steel Corporation continues in the market for 2,000 or 2,500 service cars and 15 locomotives, and other inquiries include 5,000 box cars for the Harriman lines and 2,500 box cars for the New York Central. The Pennsylvania railroad has purchased 1,500 hoppers and 1,500 coke cars. The New York Central has ordered 1,000 hopper cars, making its total purchases during the last 18 months about 40,000 cars. The St. Paul railroad will build 3,000 box cars at its own shops in addition to the 3,000 recently reported. The Canadian Pacific has ordered 800 flat cars, 200 stone cars and 500 ballast cars from the Canadian Car & Foundry Co.

PITTSBURGH

Increased Interest in Pig Iron

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Dec. 10.

Some of the manufacturers of iron and steel products in this district advise that new buying and specifying are beginning to fall off slightly, much to the relief of the congested mills. Particular attention is being given to deliveries, and complaint continues to be heard from anxious and oftentimes disappointed consumers.

The falling-off of new orders is attributed to several causes. Mills are not soliciting tonnages, and consumers fully realize that it is practically impossible to obtain material until after July. The leading interest continues to quote plates and shapes at 1.45c for first half delivery and independent mills are quoting from 1.50c to 1.60c. The American Sheet & Tin Plate Co., because of heavy demand, has more generally opened books for second quarter shipment, at prevailing quotations.

The pig iron market shows signs of renewed activity, and it is advised that basic has sold as high as $17, valley, for December shipment. Other grades are firm.

Rather heavy tonnages of contract furnace coke are involved in pending transactions. The Cleveland Furnace Co., Cleveland, the Thomas Iron Co., Easton, Pa., the Wisconsin Steel Co., Chicago, and several other consumers are inquiring for fuel for first half shipment.

Pig Iron.—Some of the heaviest melters in this and adjacent districts are negotiating for Bessemer and basic and some quiet buying has been done. All of the consumers who figured on the market during the last buying movement are informally asking quotations on steel making iron at this time. It is understood that one of the local steel companies has obtained about 12,000 tons of basic for December shipment through a Mahoning valley blast furnace interest. No definite information regarding this transaction is announced, although it was rumored today that it was closed at somewhere in the neighborhood of $16.50, valley.

It is announced that one of the melters just outside of this city obtained 1,000 tons of prompt basic the latter part of last week at $17, valley, which is the highest price at which this grade has sold for several years. Some of the most experienced in the trade say that there is almost unprecedented shortage of steel making iron. The Commonwealth Steel Co., St. Louis, is inquiring for 5,000 tons of basic to be shipped the first half of next year.

No large tonnages of foundry or malleable are involved in pending inquiries although there is considerable demand for small blocks. Foundry is firmly held at $17.50, valley. The last malleable sale of importance closed at 25 cents below that figure. Gray forge is selling at a spread from $16 to $16.50, valley.

The Andrews & Hitchcock Iron Co.'s stack at Hubbard, O., which went out of blast several weeks ago, will resume operations this week and will run on foundry. The other stack will change from foundry to Bessemer. Quotations are as follows:

(Remainder of Year and First Quarter.)	
Bessemer, valley	$17.25
Bessemer, Pittsburgh	18.15
Basic, valley	16.50 to 17.00
Basic, Pittsburgh	17.40 to 17.90
No. 2 foundry, valley	17.50
No. 2 foundry, Pittsburgh	18.40
Malleable, valley	17.25 to 17.50
Malleable, Pittsburgh	18.15 to 18.40
Gray forge, valley	16.00 to 16.50
Gray forge, Pittsburgh	16.90 to 17.40

Ferro-Alloys.—Sellers of 80 per cent ferro-manganese are quoting $65, seaboard, for forward delivery, although many believe this quotation a nominal one, inasmuch as few of the agents have authority to sell beyond Jan. 1. A small lot of ferro-manganese sold at $82 a few days ago for prompt delivery. Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for both prompt and forward delivery, and lower grades remain unchanged in price, although it is doubted whether material could be obtained at minimum figures.

We quote 80 per cent ferro manganese at $73 to $75, Baltimore, for prompt delivery and $65 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for prompt and forward delivery; 12 to 13 per cent, $25 to $26, 11 to 12 per cent, $24 to $25; 10 to 11 per cent, $23 to $24; 9 to 10 per cent, $22 to $23, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—Several mills advise that demand for plates has fallen off slightly, and specifying is not so heavy as it was a few weeks ago, much to the relief of the congested mills. Steel plates are selling at a spread from 1.45c to 1.60c for forward delivery and as high as 2c and 2.05c has been paid for prompt material.

The Pennsylvania railroad has closed for 3,000 cars, including 1,500 gondolas and 1,500 coke cars. Orders for gondolas were placed in lots of 500 with the Pressed Steel Car Co.; the American Car & Foundry Co., and the Ralston Steel Car Co. The order for coke cars was distributed as follows: The Cambria Steel Co., 700; the Standard Steel Car Co., 600; and the American Car & Foundry Co., 200. Car builders in this district have taken no other large orders. We quote the market as follows:

Standard steel plates ¼ inch thick. 6¼ to 100 inches, 1.45c to 1.60c for shipment after Jan. 1 and 1.65c to 1.90c for prompt shipment. For extras, see card of Sept. 1, 1909.

Sheets.—The scarcity of raw material has handicapped sheet makers throughout the country. None of the mills in this district is operating at desired capacity, although production has been comparatively heavy. A number of manufacturers have had to shut down some of their mills on account of inability to obtain sheet bars. Prevailing quotations are being firmly maintained for forward delivery, but mills in a position to make prompt shipment are obtaining $3 and $4 a ton above these quotations.

There has been considerable demand for prompt material and consumers seem perfectly willing to pay whatever price is quoted. We quote for prompt delivery: No. 10 gage, blue annealed, $1.80 to $1.85; No. 28 gage black, $2.35 to $2.40; No. 28 gage galvanized, $3.55 to $3.60. Prices for forward delivery on all grades are:

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $1.90 per 100 pounds; Nos. 13-14 gage, $1.95; Nos. 15-16 gage, $2.00; Nos. 17-21 gage, $2.05;

Nos. 22-24 gage, $2.10; Nos. 25-26 gage, $2.15; No. 27 gage, $2.20; No. 28 gage, $2.25; No. 29 gage, $2.30; No. 30 gage, $2.40.

Tin mill sizes. Nos. 15-16 gage, $2.00 per 100 pounds; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-27 gage, $2.15; No. 28 gage, $2.20; Nos. 29-30 gage, $2.25; Nos. 30½-31 gage, $2.30; No. 32 gage, $2.35.

Blue Annealed.—Nos. 3-8, $1.60 per 100 pounds; Nos. 9-10, $1.65; Nos. 11-12, $1.70; Nos. 13-14, $1.75; Nos. 15-16, $1.85.

Galvanized.

Nos. 10-11 gage, $2.40 per 100 pounds; Nos. 12-14 gage, $2.50; Nos. 15-16 gage, $2.65; Nos. 17-21 gage, $2.80; Nos. 22-24 gage, $2.95; Nos. 25-26 gage, $3.10; No. 27 gage, $3.25; No. 28 gage, $3.40; No. 29 gage, $3.55; No. 30 gage, $3.70.

Roofing Sheets

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate.—The heavy buying movement on the part of tin plate consumers is practically at an end. Salmon packers, condensed milk can interests and can factories have placed orders for material to be shipped during their respective seasons of 1913. The $3.60 base price is being firmly maintained. All serviceable mills are operating at maximum capacity. We quote the market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Material.—No large orders for rails have been placed with mills in this district this week. All of the leading railroads have covered requirements, although it is expected that many of the roads will order supplemental tonnages in the near future. Spikes are being quoted at a range from 1.90c to 2c. Mills are from 60 to 90 days deferred in shipments. Demand for tie plates has fallen off. Rails are quoted as follows, with the base price of open-hearth steel sections at 1.34c per pound at the mill.

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.40c to 2.50c, base, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9-16	1.90c to 2.00c
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars.—According to advice from some of the leading producers, nearly all of the heaviest consumers in this district have closed negotiations for semi-finished steel requirements through the first quarter of 1913 and several interests have been able to obtain material through the first half of the new year. The bulk of next year's tonnage was obtained at slightly below present prices, although some tonnage was placed at quotations in effect today.

Agricultural implement manufacturers have been able to cover requirements through most of next year. None of the larger producers of billets and sheet bars is able to offer as much material for next year as it sold for 1912 delivery, due to the demand for steel in their own finishing mills. Although the production of semi-finished steel products will be increased considerably next year, the acute scarcity will not be relieved until the second quarter.

Finishing mills throughout the entire district have been embarrassed because of the scarcity of semi-finished products. In many instances consumers are able to obtain only half as much steel as they desire. The infrequency of sales makes it possible only to offer nominal quotations, which are as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $27.00, with the usual extra for size and analysis and open-hearth rolling billets, $27.50. Bessemer sheet and tin bars are quoted at $28.00 and open-hearth sheet bars are quoted $28.50, f. o. b. Pittsburgh and Youngstown, with full freight to destination added. Forging billets are quoted at $34.00, Pittsburgh.

Hoops and Bands.—The market for hoops and bands is quiet. Bands are quoted at 1.40c to 1.45c and hoops at a spread from 1.50c to 1.60c.

Hoops in carload lots, 1.50c to 1.60c, Pittsburgh, in less than carload lots, 1.55c to 1.60c; bands, 1.40c to 1.45c, base, with net extras, as per standard steel.

Merchant Bars.—There is practically no change in the market for steel and iron bars for forward delivery. Consumers advise that it is almost impossible to obtain steel bars for prompt delivery unless warehouse prices are paid. Mills are making heavy shipments, although few manufacturers have yet begun to ship tonnage placed on the present 1.40c quotation.

Iron bars are being firmly maintained at a spread from 1.70c to 1.80c, although it has been expected for some time that the minimum figure would disappear. Shafting is firm on a basis of 60 per cent off for carload lots and 55 per cent off for less than carload lots. The Columbia Steel & Shafting Co. broke all previous records last month from the standpoint of shipments and specifications and received an unusually large number of new orders. Quotations follow:

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c to 1.45c; plow and cultivator, 1.40c to 1.45c; channels, angles, zees, tees, under 3 inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds of a size, 0.35. Cold rolled and ground shafting, 60 per cent off in carloads and 55 per cent in less than carloads delivered in base territory.

Muck Bar.—There is no change in the market for muck bar. Heaviest consumers covered requirements earlier in the year and few makers have been able to offer surplus tonnages. We quote muck bar at $32, Pittsburgh.

Bolts, Nuts and Rivets.—Talk of an early advance in rivets and nuts is heard in the trade and it is probable that new discounts soon will be issued on bolts. Several manufacturers have been selling material for delivery next year at present prices. Rivet makers are obtaining steel bars somewhat below the present market price. As soon as low-priced tonnage is consumed, it is believed that rivet prices will advance $1 or $2 a ton. We quote the market at the beginning of this week as follows:

Rivets

Button head structural rivets, 2.10c; cone head boiler rivets, 2.20c. Small rivets 75, 10 and 10 off.

Bolt and Nut Discounts

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75, 10 and 2½; cut threads, 75 and 7½; larger and longer, 70 and 5.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10, and 7½; cut, 75, 10 and 2½; larger and longer, 70, 10.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.80 off list; hot pressed hexagon blank or tapped, $6.40.

Cold pressed C. & T. square, blank or tapped, $5.80 off; hexagon, blank or tapped, ½-inch and larger, $6.70 off; ⅜ inch and smaller, $7.30 off.

Structural Shapes.—Fabricators in this district have not booked any large orders this week. Contracting usually experiences a lull at this time of the year, and it is not probable that any large orders will be taken until after Jan. 1. Fabricators are catching up somewhat in deliveries. Some interest is taken in the bids for revised plans for the Elizabeth Steel Magee hospital, of this city, which will require about 600 tons. Consumers advise it is impossible to obtain structural material except for forward shipment. We quote the market as follows:

Standard structural shapes, 1.45c to 1.60c, for shipment after Jan. 1. For extras see card of Sept. 1, 1909.

Merchant Pipe.—An analysis of the new classification of steel pipe, effective Jan. 1, is given on another page in this issue. New discounts and a

table showing difference in the cost and weight of black and galvanized pipe are included.

Boiler Tubes.—Demand for iron and steel boiler tubes continues fairly heavy. Manufacturers of steel boiler tubes have advised the trade that there will be no change in discounts the first of the year, as many had expected. The following discounts are firmly maintained:

	Steel.	Iron.
1¼ inch	..	..
1¼ to 2¼ inch	62	47
2½ inch	64½	52
2¾ to 3¼ inch	69½	54½
3½ to 4½ inch	72	57
5 and 6 inch	64½	..
7 to 13 inch	62	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Products.—Jobbers and manufacturers are beginning to enter the market for all grades of wire products, and some of the mills have taken rather heavy tonnages for delivery the next 60 days. Several manufacturing interests are negotiating for requirements throughout the first quarter. The bulk of the tonnage is being sold at $1.70 for nails and $1.50 for plain wire, although mills quoting $1 a ton above these figures have been receiving rather good orders.

Wire products have been advanced $4 since the first of the year and at no time has the market displayed any weakness. We quote as follows:

Wire nails, jobbers' carload lots, $1.70 to $1.75, retailers' carload lots, $1.75 to $1.80; cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.70 to $1.75; retailers' carload lots, $1.75 to $1.80, with 40c for galvanizing; plain wire to jobbers in carloads, $1.50 to $1.55; and to dealers, in carloads, $1.55 to $1.60; polished staples, $1.70 to $1.75; galvanized staples, $2.10.

Wire Rods.—There has been some new demand for wire rods, but no sales have been made. Shipments are being urged and some embarrassment has been experienced on account of deferred deliveries. We quote both Bessemer and open-hearth wire rods at $30, Pittsburgh.

Car Wheels.—The Carnegie Steel Co. has taken an order from the Boston elevated railway for 500 car wheels for electric railroad service. Wheels are quoted as follows: 33-inch freight car wheels, $15 to $15.50; 36-inch passenger train car wheels, $19 to $19.50.

Coke.—There is considerable demand for contract furnace coke for the first six months of 1913. Several consumers are in the market for supplemental tonnages and three or four blast furnace interests are figuring requirements through the first half year, apparently deciding that the market will grow no weaker. Standard contract coke for first half delivery is not being sold below $3.25, ovens, although several consumers have been able to shade this figure by taking slightly off-grade fuel.

A consumer in an adjacent district has closed for 4,000 tons a month for first half shipment at $3.25, ovens. Several producers are refusing to shade $3.50, ovens. A Buffalo interest with stacks just outside of that city is negotiating for 12,000 tons a month for first half shipment and the Thomas Iron Co., Easton, Pa., has formally opened negotiations for first half fuel for shipment to furnaces at Hokendauqua, Pa. Another blast furnace interest with stacks in the northern Chicago district is attempting to obtain fuel through the first half, and the Cleveland Furnace Co., Cleveland, has formally opened negotiations for first half requirements, asking for 15,000 tons a month for shipment to stacks at Cleveland.

The Wisconsin Steel Co., which has figured in the market before, is inquiring for a few thousand tons a month for shipment to Chicago. Several other consumers are informally negotiating for fuel. Spot furnace coke is somewhat stronger this week than last and several sales have been made at $4.05, ovens. Demand for foundry coke for both prompt and future shipments is rather heavy although prevailing quotations are being maintained so far as can be learned.

Weekly reports of the Connellsville *Courier* indicate that production in the upper and lower regions this year will exceed that of last year by a broad margin. Production the first three quarters of the year was as follows: First quarter, 5,034,709 tons; second quarter, 5,109,921 tons; third quarter, 4,742,685 tons. If the production the last four weeks of the year does not fall below expectations, more than 19,000,000 tons of coke will have been produced in 1912. This record compares favorably with that of any year since 1907.

The *Courier* of the week ending Nov. 30, says that production was 400,111 tons, a decrease of 4,541 tons, compared with the week before. Shipments decreased 131 cars. The number of active ovens was increased by the firing of seven scattering ovens. We quote the market as follows:

Connellsville furnace	$3.90 to 4.05
Connellsville furnace contract	3.25
Connellsville foundry	4.50 to 4.75
Connellsville foundry contract	4.00 to 4.25

Old Material.—The market for iron and steel scrap is in practically the same position as it was a week ago and there is some indication of an upward tendency. The heavy buying movement of several weeks ago placed consumers in a rather independent position and none of the large interests has had to buy additional material for some time. Some of the smaller dealers, who bought stock a number of weeks ago, are selling direct to the mills, being unable to obtain desired prices from the larger city dealers.

Heavy melting steel continues to sell at about $15. No sales have been made above that figure. Agricultural malleable has sold 25 cents a ton above the price prevailing a week ago, and is now quoted at a spread from $13.50 to $13.75. A fairly heavy tonnage of iron axles sold a few days ago at between $26 and $27—$1 a ton above prices of last week. Old car wheels are somewhat stronger. Other grades remain unchanged. We quote, per gross ton, delivered in this district, as follows:

Heavy melting scrap	$15.00
Rerolling rails	16.50 to 17.00
Malleable	14.50 to 15.00
Agricultural malleable	13.50 to 13.75
Bundled sheet scrap	13.00 to 13.50
Iron axles	26.00 to 27.00
Old iron rails	16.75 to 17.25
Stove plate	11.00 to 11.50
No. 1 wrought scrap	15.50 to 16.00
Old car wheels	16.25 to 16.50
Low phosphorus	18.00 to 18.50
Machine shop turnings	11.00 to 11.50
No. 1 busheling	14.25 to 14.75
Country mixed	11.00 to 11.25
Cast borings	10.25 to 10.50
No. 1 cast scrap	14.50 to 15.00

STRIKE BROKEN

And Carnegie Plants Resume—Many Men Return.

Pittsburgh, Dec. 10.—The backbone of the strike of 500 trainmen employed by the Carnegie Steel Co. has been broken, and plants at Homestead and Braddock and the Carrie furnaces are again operating, practically at full capacity.

It is estimated that all but about 100 of the striking employes are again at work, having decided to return at the same pay received before the walk-out of about two weeks ago. The company has refused to give employment to some of the strikers, for disciplinary reasons, and others have obtained work elsewhere.

Reports to the effect that striking trainmen had divided into two factions, one adhering to the American Federation of Labor and the other to the Industrial Workers of the World, appear untrue. It is advised that an attempt was made to organize the striking trainmen, but so far as can be learned, few of the men displayed any interest in the proposals of labor organizations.

CHICAGO

Melters Urge Anticipation of Shipments

Office of THE IRON TRADE REVIEW,
1328 Monadnock Blk., Dec. 10.

The past week has indicated that the usual seasonal dullness may not materialize. While the pig iron market is quiet, there is but little relaxation in finished lines, both specifications and new business continuing at practically the same rate as that during November. One of the leading producers in this territory reports a tonnage of both specifications and new business almost equal to the largest week of the previous month, which was one of the four largest months of the year, and other mills are experiencing a like activity. There has been an appreciable strengthening of prices for some finished products, bar iron being quoted at a minimum of 1.57½c and a small tonnage of steel bars having been sold to a Pacific coast buyer on a basis of 1.68c, Pittsburgh. Although the demand on jobbers is phenomenal, no further advances are expected until there is a corresponding increase in mill quotations.

Pig Iron.—Quietness in the pig iron market has been carried over from the previous week and while some new inquiries appear, they are confined with but few exceptions to small tonnages. The only large inquiries appearing are for basic iron sent out by St. Louis consumers, and include an inquiry for 5,000 tons for first half delivery from the Commonwealth Steel Co. The most interesting development of the week has been the continuation of requests from melters to anticipate delivery. Although furnaces have been following the policy of complying with these requests wherever possible, during the last few days it has become difficult to do so and in many cases they have been forced to refuse. Northern iron is still quotable at $18 f. o. b. local furnaces with one of the local interests adhering to $18.25 at all of its stacks. While these prices are very firm, it is not probable that any great advances will be made unless the demand after the first of the year reaches unexpected proportions. The attitude of the foundries with regard to deliveries is due in some cases to shortages of stocks, necessitating immediate shipment, but in the majority of instances is thought to be due to a feeling that car shortages and other difficulties may delay furnace deliveries. It is difficult to quote the southern market, owing to the absence of sales of consequence and indefinite quotations by Birmingham producers. Iron for prompt delivery remains at $14, Birmingham, and one southern furnace is quoting $14.50 for first half. With the first quarter so close at hand, the former quotations might apply to iron bought for delivery at that time, but it is problematical whether or not the furnaces would accept an order at that figure for delivery over the entire first quarter. Sales on that basis, however, have been made for delivery during December and January.

It is probable that the present state of quiet will continue until after the first of the year, as many consumers close their books on Jan. 1.

The following prices represent the market for Chicago delivery, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces.

	Prompt shipment.	First quarter.
Lake Superior charcoal	$18.75	$18.75
Northern foundry No. 2	18.00	18.00
Southern foundry No. 2	18.35	18.35
South'n Silveries, 5 per cent sil.	.....	19.85
Jackson co. silv'r's 8 per cent.	21.40	21.90
Malleable Bessemer	18.00	18.00
Alabama basic	.....	18.85

Merchant Bars.—While quotations on steel bars remain nominal to a great extent, there has been an appreciable stiffening during the last 10 days. This is well indicated by a sale made by a local producer to a buyer on the Pacific coast for fairly prompt delivery on a basis of 1.68c, Pittsburgh. While this quotation was due largely to the fact that the same freight differential maintains between both Pittsburgh and Chicago and the coast, it shows the strength of the market to a considerable extent. Bar iron also is stronger, the previous minimum of 1.55c having disappeared. The present market is quotable at 1.57½c to 1.62½c, the majority of the business being placed at about 1.60c. A small tonnage, carrying $14 per ton in extras, was sold at this price during the week. Owing to the continued scarcity of rerolling rails, the market for hard steel bars remains very firm.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.57½c to 1.62½c, hard steel bars, rerolled, 1.65c to 1.75c, soft steel bars, bands and small shapes, 1.63c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 60 per cent off list for carload lots, 55 per cent off for less than carloads.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.95c per pound base; soft steel bars, 1.95c per pound base; soft steel hoops, 2.20c, full extras.

Structural Material.—Specifications for this material show but little decrease for the first week in December, and considerable new business has been taken by local producers during that time. Delivery conditions remain unchanged, being, if anything, worse from day to day. About four months is the shortest time in which any sellers in this district can make deliveries. The structural lettings for the week, however, were fairly good, totaling 5,464 tons, and including two good size contracts. These were 1,630 tons taken by the South Halsted Street Iron Works from the city of Chicago for the Carter Harrison school, and 1,096 tons taken by the Toledo Bridge & Crane Co. from the same buyer for the Chicago avenue new bridge. The leading interest is represented by a single contract of 248 tons taken from the Elgin, Joliet & Eastern Railway Co., for girder spans. The Darbyshire Harvie Iron Co. has taken 663 tons from the Old Dominion Mining & Smelting Co. for a new plant at Globe, Ariz., and the Wisconsin Bridge & Iron Co. has taken 840 tons from the Chicago, Milwaukee & St. Paul Railway Co. for girder spans. The Northern Pacific Railway Co. has placed a contract for 197 tons of deck plate girder spans for bridge No. 40 over the Pilchuck creek, and the Hydraulic Engineer Co. of Maine has placed a contract for 260 tons for 13 highway spans near Keokuk, Ia. A contract has also been let by the French Lick Springs Hotel Co. for 530 tons of shapes for a new bottling house.

We quote, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles over 6 inches, $2.15 per 100 pounds, base; beams,

3 to 15 inches, inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds, base.

Rails and Track Fastenings.—Rail orders and specifications for track fastenings continue to keep pace with other finished lines, the first week in December showing no diminution in either specifications or new business. There has been considerable increase in orders for track fastenings, as the railroads become able to estimate their requirements more closely. Quotations remain firm, a marked upward tendency being apparent in both spikes and track bolts.

We quote light rails, f. o. b. Chicago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $24; standard section relaying rails, subject to inspection.

Track fastenings, f. o. b. Joliet, angle bars 1.50c; railroad spikes, 1.95c; smaller size spikes, 1.75c base; track bolts with square nuts, 2.30c to 2.40c.

Plates.—Consistent with other finished lines, specifications against contracts for plates have decreased but little during the first week of the current month. While a considerable portion of the total was received from car builders, business is fairly well spread out. Car orders continue fairly active, and a number of good contracts have been placed. The Canadian Pacific has ordered 800 flat cars, 200 stone cars and 500 ballast cars from the Canadian Car & Foundry Co., and the Chicago, Milwaukee & St. Paul has ordered 10 combination postal and baggage cars and 23 postal cars from the American Car & Foundry Co. This railroad will build 3,000 box cars at its own shops in addition to the 3,000 mentioned previously, for which the underframes have been ordered from the Bettendorf Axle Co. The Northern Pacific will also build 500 flat cars in its own shops.

We quote. f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 65½ to 100 inches wide, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $2.05.

Bolts, Nuts and Rivets.—The market for bolts, nuts and rivets is comparatively quiet and no further advances on the latter have materialized. The market, however, is very firm. While the larger part of the new business in this territory has been placed, it is probable that the early spring will see a very active market due to the number of structural contracts which have been held over on account of inability to obtain steel.

We quote prices on bolts, nuts and rivets as follows:

Rivets

Structural rivets, ¾ to 1¼ inches, 2.28c, base, Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ¾ x 6 inches, rolled thread, 75-10-2½; larger sizes, 70-5.

Machine bolts, up to ¾ x 4 inches, rollel thread, 75-10-7½; cut thread 75-10-2½; larger sizes, 70-10.

Hot pressed nuts, square head, $5.80 off per cwt.; hexagon, $6.40 off per cwt.

Sheets.—No perceptible change is apparent in this market over conditions maintaining a week ago, and prices are very firm. Western producers continue to discourage second half business, although the insistent demands of old customers have forced some of it on the books.

We quote, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.15c; No. 12, 2.20c. Box annealed, No. 28, 2.70c. Galvanized No. 28, 3.95c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products.—It is reported that considerable business for first half delivery is being taken in this territory, following the recent action of eastern sellers. Prices, while exceedingly firm, remain at the same level, as the leading interest continues to quote on the basis of $1.70, Pittsburgh.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $1.98; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $1.98, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.68; retailers' carload lots, $1.73.

Merchant Pipe and Tubes.—Comparative quiet still maintains in the market for merchant pipe and tubes, and makers have been able to better the delivery situation to some extent. Some consumers of steel pipe in this territory are reluctant to contract for their first half requirements, expecting that the first of the year will see price reductions. Quotations are very firm, however, although there have been no recent advances, and the renewal of business operations in the spring should bring with it an active demand for steel pipe.

We quote store prices on merchant pipe and tubes as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	41.2
⅜ inch	73.2	62.2	67.2	51.2
½ inch	73.2	62.2	67.2	51.2
¾ inch to 1½ inch.	76.2	67.2	70.2	58.2
Lap.				
2 inch	73.2	64.2	67.2	57.2
4½ inch to 6 inch.	75.2	66.2	68.2	59.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	66.2	55.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	59.2	47.2
½ inch	69.2	57.2	64.2	52.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	65.2	53.2
7 inch to 8 inch....	64.2	52.2	59.2	47.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1½ inch	60.2	48.2	....	....
Lap.				
2 inch	58.2	46.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	37	..	55½
1¼ to 2¼ inch.....	53	38	34
2¾ to 3¼ inch.....	63	48	44
3½ to 4½ inch.....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe.—The seasonal dullness in the cast iron pipe market will probably continue until some time in January, when the larger municipalities come into the market for their requirements. For the last 30 days, business has been confined to specifications for small lots. The market is firm at current quotations, and it is probable that no further advances will be made for some time.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $31, 6 to 12 inches, $29, larger sizes, $28, gas pipe, $1 a ton higher.

Old Material.—With the exception of re-rolling rails and shoveling steel, there has been no change in the scrap quotations during the week. Shoveling steel is now quoted at a decline of 50 cents a ton, and re-rollers have advanced 25 cents. The pronounced scarcity of the latter still continues and contrary to usual market conditions, a large offering would bring about an advance of $1 per ton or more. On account of their inability to obtain re-rolling rails, some of the large steel bar mills in this territory are operating on single shift. As any appreciable tonnage would enable them to operate at capacity for a time at least, much higher prices could be paid without greatly impairing the margin of profit. Embargoes are still being maintained in many instances, there being but one large consumer in this district that has escaped so far. Railroad offerings are small and include a list issued by the St. Louis & San Fran-

cisco consisting of 512 tons of mixed scrap, of which the principal item is 85 tons of light sheet No. 1. Bids on this list were closed on Monday. The Chicago, Milwaukee & St. Paul has invited bids on 2,440 tons of scrap, of which the principal items are 750 tons of steel rails and 500 tons of No. 2 wrought. Bids were closed Dec. 10.

We quote for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$14.75 to 15.25
Old iron rails	17.00 to 17.50
Rerolling rails (5 ft. and over)	16.50 to 17.00
Old steel rails (3 ft. and und.)	14.50 to 15.00
Frogs, switches and guards	13.75 to 14.25
Heavy melting steel	13.50 to 14.00
Shoveling steel	13.00 to 14.00

Net Tons

No. 1 R. R. wrought	$12.75 to 13.25
No. 2 R. R. wrought	11.75 to 12.25
Arch bars and transoms	16.75 to 17.25
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.50 to 17.00
Iron car axles	21.50 to 22.00
Steel car axles	17.75 to 18.25
Locomotive tires	13.50 to 14.40
Dealers forge	10.75 to 11.25
Pipe and flues	10.00 to 10.50
No. 1 cast	13.50 to 14.00
No. 1 busheling	11.25 to 11.75
No. 2 busheling	8.50 to 9.00
No. 1 boiler cut	10.00 to 10.50
Boiler punchings	13.00 to 13.50
Cast and mixed boring	7.25 to 7.75
Machine shop turnings	8.25 to 8.75
Railroad malleable	13.50 to 14.00
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.50 to 17.00
Angle bars steel	12.50 to 13.00
Stove plate and light cast scrap	11.00 to 11.50

CLEVELAND

Steady Buying of Iron Ore

Office of THE IRON TRADE REVIEW,
Penton Bldg., Dec. 10.

Iron Ore.—Owing to storms on Lakes Superior and Huron, belated ships carrying coal and grain have been experiencing great difficulties during the past few days, but ore shippers refused to risk the lives of crews and the loss of property and the entire tonnage of ore shipped in December was trifling, it being only 14,579 tons the first few days of the month. Of the 4,072,674 tons shipped during November and 14,579 in December, 3,811,530 tons went to Lake Erie ports.

Iron ore sales have continued steadily during the past week and very few merchant furnaces have failed to buy for at least a considerable part of their requirements for next year.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40.

Pig Iron.—As melters in the Cleveland district have bought practically all they estimate they will need during the first half of next year, there is very little buying at present. No one seems to be disposed to contract for delivery after July 1, 1913, and until the buying for the third quarter or last half of next year sets in, there will be very little activity. A sale of Ironton iron at $17, furnace, or $18.70 delivered in Cleveland territory, shows the strength of the present market. For delivery this month and the first half of next year, we quote as follows:

No. 1 foundry	$18.25 to 18.75
No. 2 foundry	17.75 to 18.00
No. 2 southern	18.35 to 18.85
Bessemer	18.15 to 18.40
Lake Superior charcoal	19.10 to 19.75
Silveries 8 per cent silicon	20.25 to 21.55
Bessemer ferro, 11 per cent	26.55

Coke.—Buying of foundry coke is limited to small lots for prompt shipment, the usual price being $4.65, ovens. The buyers are foundrymen who find they need more than has been provided for by their contracts and they are not disposed to complain of the high price.

Connellsville furnace coke, $3.90 to $4.00 for prompt delivery, and $3 to $3.25 on contract; Connellsville foundry coke, $4.50 to $4.65 for prompt, and $4.25 to $4.50 on contract.

Finished Material.—There has been some decrease in specifications in finished materials this month, but consumption seems to be just as heavy as at any time and prices just as strong. Consumers have become adjusted to conditions and are not causing the mills as much trouble by insistent demands for deliveries. Bids on concrete piers for the Clark avenue bridge will be received Dec. 19. About 250 tons of reinforcing bars will be required. This bridge will ultimately require about 8,000 tons of steel, but contracts for shapes will not be placed for a number of months. The Diamond Alkali Co., Fairport, will erect a factory building which will require 240 tons of structural material. The steel will be furnished by the Jones & Laughlin Steel Co. Plans are out for the Lake Shore bridge across the Calumet river, Chicago, requiring 2,600 tons of steel, of which 2,000 tons will be nickel steel. All steel companies are taking new business cautiously and tonnages which buyers wish to place are being cut down in some cases far below the tonnage desired. Warehouses have advanced their quotations on shapes and plates to 2.25c and on bars to 2.10c.

Old Material.—All grades of scrap are quiet and steady. There is no special desire on the part of the consumer to buy, or of the dealer to sell. Free acceptance by mills of shipments on contracts continues to be made. Inquiry for heavy melting steel remains normal. Prices, which are unchanged, follow:

Gross Tons.

Old iron rails	$17.75 to 18.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old steel rails (over 6 ft.)	16.25 to 16.75
Relaying rails	25.00 to 26.00
Old steel boiler plate	11.50 to 12.00
Malleable iron (railroad)	14.50 to 15.00
Steel axles	19.50 to 20.00
Axle turnings	12.50 to 13.00
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	14.00 to 14.50
Country mixed steel	11.00 to 11.50
Bundled sheet scrap	11.75 to 12.25

Net Tons.

No. 1 R. R. wrought	$14.50 to 15.00
No. 1 busheling	12.50 to 13.00
No. 1 machine cast	13.50 to 14.00
No. 1 dealers' wrought	11.50 to 12.00
Machine shop turnings	8.25 to 8.50
Pipes and flues	10.00 to 10.50
Wrought drillings	8.50 to 8.75
Cast borings	8.00 to 8.50
Stove plate	10.50 to 11.00
Wrought iron piling plate	16.00 to 16.50
Wrought iron arch bars	17.00 to 17.50

Furnace is Rebuilt

Finishing touches are being put upon the rebuilding of the Princess blast furnace at Glen Wilton, Va., which was badly damaged a number of weeks ago by a cave-in of the shell. The stack has been rebuilt entirely above the mantle. A new stove, downcomer and two dust-catchers have been installed. The improvements will slightly increase the capacity of the furnace to about 3,000 tons monthly. The furnace will be blown in about the first of the year.

Furnace to Resume.—The blast furnace of the Leesport Furnace Co., Leesport, Pa., is being put in condition to resume in the near future. This furnace has not been in operation for several years.

CINCINNATI

Spot Southern Pig Obtainable at $13.50

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., Dec. 10.

Pig Iron.—The southern pig iron situation has strengthened a little within the past week, but it has not as yet entirely recovered from the slight slump of about 10 days ago, which was caused by the sudden appearance of a quantity of resale iron in the market, which was offered for prompt shipment at $13.50, Birmingham basis, and also by an Alabama furnace meeting this figure for the same delivery. This furnace has recently, however, advanced its price again to $14, Birmingham, for No. 2 foundry iron for shipment from the present date through the first quarter, and a large part of the resale iron has either been disposed of or has also been advanced to the above level. There still remains some iron in both Alabama and Tennessee, but mostly in the latter state, to be had for December delivery at $13.50, Birmingham basis. There is probably no furnace iron in Alabama at this figure, being all Birmingham resale lots, but in Tennessee it is distributed among both furnaces and resale agents. On the other hand, some furnaces and dealers in both states are holding for nothing less than $14, Birmingham, for any delivery through the first quarter, thus making the spot market in the south $13.50 to $14, Birmingham, with a strong tendency to reach the latter as a minimum before the end of the year. First quarter prices are general at $14, Birmingham, and second quarter prices at $14.50, same basis.

No weakening in the southern Ohio market can be noted, and it has been on a rather firm basis for some time. Furnace iron is general at $17, Ironton, for any delivery through the first half, and the only iron below this price is in small resale lots that are in evidence from time to time. These are offered at $16.50 and $16.75, Ironton, but mostly at the higher figure.

The market in both districts is slow, and is not featured by buying and selling of any note. Most of the sales are for first or second quarter delivery, and are usually in small tonnages. Recent sales include 1,500 tons of low phosphorus iron for first half shipment into Michigan; 500 tons of southern charcoal iron for the first half, which sold at $25, furnace, and 500 tons of southern iron to a southern railroad at $14 a ton for practically prompt delivery. Recent inquiries include 5,000 tons of basic iron from St. Louis, for the first half; 500 tons of low grade iron for prompt shipment, from central Ohio, and 500 tons of analysis iron for the first half from northeastern Ohio. With freight rates $3.25 from Birmingham and $1.20 from Ironton, we quote Cincinnati prices for the first and second quarters of next year as follows:

Southern foundry No. 1	$17.75 to 18.25
Southern foundry No. 2	17.25 to 17.75
Southern foundry No. 3	16.75 to 17.25
Southern foundry No. 4	16.50 to 17.00
Southern gray forge	16.50 to 16.75
Mottled	16.25 to 16.75
Southern No. 1 soft	17.75 to 18.25
Southern No. 2 soft	17.25 to 17.75
Standard southern car wheel	27.50 to 28.00
Northern No. 2	17.95 to 18.20
Northern No. 3	17.45 to 17.95
Northern No. 4	17.20 to 17.70
Silveries 8 per cent silicon	20.20 to 21.20

Coke.—There is a good inquiry for coke in the market, but not much business is being done because the prices asked by the ovens for both furnace and foundry grades are higher than consumers are willing to pay, and also dealers state that they do not want to take any additional business at the present time, as the orders they already have on their books cannot be taken care of. We quote for prompt and contract delivery from the leading coke producing districts as follows:

Connellsville district:	Prompt shipment.	Contract.
Foundry coke	$4.25 to 4.75	$3.75 to 4.00
Furnace coke	3.85 to 4.25	3.00 to 3.50
Wise county district:		
Foundry coke	$4.00 to 4.25	$3.75 to 4.00
Furnace coke	3.50 to 4.00	3.25 to 3.75
Pocahontas district:		
Foundry coke	$3.75 to 4.00	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00
New River:		
Foundry coke	$3.75 to 4.25	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00

Finished Material. — Specifications are beginning to become a little lighter, due to the approaching holidays, and also to the fact that dealers of finished materials in many instances, are beginning to take stock. The colder weather has also lightened the demand, especially for building materials. The local sheet mill is still strong in regard to its prices, which were recently advanced, but is still booking business at these figures, which are as follows, Pittsburgh basis: Black sheets, No. 28 gage, 2.35c, and galvanized sheets, No. 28 gage, 3.50c. Steel bars are 1.40c to 1.45c, and structurals, 1.50c to 1.55c, Pittsburgh basis, but some of the smaller eastern makers are reported to be offering for nearby shipment at slightly higher prices. None of the larger mills can deliver in the near future, and are practically out of the market.

Warehouse business has slackened up during the past week, but this could be expected at this time of the year, and the present condition of the weather also has had a bad effect. Prices have not changed, and are as follows, f. o. b. Cincinnati:

Steel bars, 2c to 2.10c base; iron bars, 1.95c to 2.05c base; structurals, 2.10c to 2.20c base; plates, ¼ inch and over, 2.10c to 2.20c base; sheets, blue annealed, No. 10, 2.25c to 2.35c base; rivets, cone head, 2.60c to 2.70c base; cold rolled shafting, 58 per cent discount; steel hoops, 2.10c to 2.20c base; full extras; boiler tubes as follows: 1½ inch, 46 per cent discount; 1¾ to 2¼ inch, 57 per cent discount; 2½ inch 60 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 68 per cent discount; 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.15c to 2.25c; ⅝ inch square and larger, 2.25c to 2.35c; ½ inch square and larger, 2.35c to 2.45c; 5-16 to ⅜ inch square and larger, 2.55c to 2.65c; and ¼ inch square and larger, 2.65c to 2.75c.

Old Material.—Inquiries in the scrap iron market have fallen off considerably, and there is not much business being done at the present time. Heavy melting scrap is now given at from $12 to $12.50 per gross ton, and bundled sheet scrap at from $9 to $9.50 per gross ton. A recent sale of stove plate was made at $8.75 by a local dealer. We quote below prices dealers will pay and also dealers' selling prices in Cincinnati and vicinity, as follows:

Gross Tons

Old iron rails	$13.75 to 14.25
Old steel rerolling	12.00 to 12.50
Old iron axles	18.25 to 18.75
Heavy melting scrap	12.00 to 12.50
Relaying rails	21.25 to 21.75
Bundled sheet scrap	9.00 to 9.50

Net Tons

Old No. 1 R. R. wrought	$11.25 to 11.75
No. 1 machinery cast	11.50 to 12.00
No. 1 busheling	9.50 to 10.00
Stove plate	8.25 to 8.75
Machine shop turnings	7.50 to 8.00
Cast borings	7.75 to 8.25
Heavy turnings	8.00 to 8.50
Mixed cast	10.00 to 10.50
Malleable	7.75 to 8.25

PHILADELPHIA

Eastern Market Shows Strength

Office of THE IRON TRADE REVIEW,
Philadelphia, Dec. 10.

With the normally quieter holiday and year-end season near at hand, the eastern market in finished steel shows little or no signs of subsiding activity. New business is still good and specifications are heavy. It is universally expected that December will show an immense volume of specifications due to expiring contracts Dec. 31. Pig iron remains quiet, but structural conditions show great soundness. Bookings of merchant furnaces in eastern Pennsylvania at present are fully 10 times the aggregate stocks. In Virginia, the situation is also very favorable. Improvement in old material is very meager and the market seems to be in a waiting stage.

Pig Iron.—With statistical conditions of the very soundest supporting it, the eastern Pennsylvania iron market is drifting into the quiet period that usually prevails at the holiday season and at the year end. On all sides, makers are booked practically full for months ahead and have little of their expected make over the first quarter set aside for insurance against accident. The total bookings of eastern Pennsylvania merchant makers on Dec. 1 were fully 10 times the aggregate stocks on their banks. The figures of the Eastern Pig Iron Association for November showed practically no variation from the relatively small stocks on hand a month previous and the booked orders remained about even, showing that new business has fully equaled shipments. Twenty-seven furnaces of the association, or about 70 per cent, are in operation. Favorable conditions are also prevailing in Virginia, where the furnaces have only about 5,000 tons in stock besides the large tonnage of the leading makers there, which is now all sold and moving freely into consumption. Beyond the purchases by a Delaware river pipe maker of low grade southern iron at a somewhat lower quotation than recently available, no price easiness has developed. The recent purchases of one consumer of this type are reported as averaging $17.60, delivered, for both northern and southern grades. The recent lower southern sales are attributed to lots in speculative hands. Eastern Pennsylvania foundry irons are firm at $18.25 to $18.50, Philadelphia, for No. 2X, for nearby or forward shipment. Some fair lots are moving. One specialty foundry took 1,000 to 1,500 tons of No. 2X, first quarter, from eastern furnaces at full prices. Several 500-ton lots of foundry are pending or have been closed. A lot of 1,000 tons of forge is before makers. A large New York state forge consumer has purchased 7,000 tons of forge for third quarter, the metal to come from makers in that state. Sales of low grade Virginia iron aggregating several thousand tons, are reported on the full No. 2X basis of $16, furnace, for first half, and $15.50 for second half. The Norfolk & Western railroad is still negotiating for its forward requirements of its Roanoke shops. Steel-making grades are inactive. No inquiry whatever for basic is now current. The price range remains as quoted. Several hundred tons additional of low phosphorus have been done on the $24.50, Philadelphia basis. The new No. 2 Worth furnace has been blown in and the Leesport, Pa., stack will soon resume. The rebuilt Princess furnace will go in shortly.

We quote for prompt and first quarter shipment, delivered to consumers' plants in Philadelphia and vicinity, as follows:

Eastern Pa. No. 1X foundry	$18.50 to 18.75
Eastern Pa. No. 2X foundry	18.25 to 18.50
Eastern Pa. No. 2 plain	18.00 to 18.25
Standard forge (Eastern Pa.)	17.50 to 17.75
Basic (Eastern and Central Pa.)	18.00 to 18.25
Virginia No. 2X	18.65 to 18.80
Southern No. 2	18.25 to 18.75
Malleable	19.50 to 20.00
Low phosphorus, Philadelphia	24.00 to 24.50

Iron and Steel Bars.—Some leading Pittsburgh makers of steel bars have been advising customers in this district they have no free tonnage whatever to offer for first half. Buyers who are not fully covered upon their needs are having great trouble to supply these deficiencies. For prompt steel bars, 1.85c to 1.95c, delivered this district, is being asked by smaller makers. The eastern bar iron market is very strong and makers, enjoying the unusual condition of being unable to make deliveries for a month or more, are strong in their price policies. One leading maker, it is reported, is now quoting 1.75c, mill, but such a price would represent a maximum value at present.

We quote for delivery to consumer's plants in Philadelphia and vicinity: Steel bars at 1.55c to 1.60c on contract and common bar iron at 1.67½c to 1.77½c. Prompt steel bars on mill shipments are quoted at 1.85c to 1.95c delivered and from store are quoted at 2c to 2.15c, delivered. Cut nails are quoted from $1.85 to $1.90, Philadelphia. Shafting is quoted at 60 and 55 off in base territory.

Plates and Shapes.—The Pennsylvania railroad has ordered 3,000 additional cars, of which 1,500 steel gondolas were divided equally among the American Car & Foundry Co., the Pressed Steel Car Co., and the Ralston Steel Car Co. The remaining 1,500 coke cars went to the Cambria Steel Co., Standard Steel Car Co., and American Car & Foundry Co., in lots of 700, 600 and 200, respectively. The Chesapeake & Ohio railroad is inquiring for 3,000 hopper cars of 70 tons capacity. Eastern plate makers report a heavily maintained movement in new buying and are very firmly holding their prices at a minimum of 1.60c, Pittsburgh, or 1.75c, Philadelphia. Some attractive tonnages offered at $1 concession under these prices have been declined. Deliveries with eastern plate mills run on sizable lots to six and eight weeks. Where small lots can be offered for especially quick shipment as high as 2c, Pittsburgh, is obtainable. Similar conditions obtain with eastern shape makers who are selling freely at 1.60c, Pittsburgh, or 1.75c, Philadelphia, on forward lots running 12 weeks, and 1.75c, mill, in small lots, for nearby shipment. Pittsburgh makers will largely furnish 4,000 to 5,000 tons of plate and shapes for three torpedo boat destroyers, awarded the Wm. Cramp & Sons Ship & Engine Building Co., and one placed with the New York Ship Building Co. The Bath Iron Works and the Fore River Ship Building Co. were also awarded one boat each. Other boat tonnage is under negotiation in the east. The Virginia Bridge & Iron Works will furnish about 1,000 tons for the Clyde line pier, Charleston, N. C. The American Bridge Co. is expected to receive about 2,000 tons for the Tutweiler apartment, Birmingham, Ala. Bids go in Dec. 16 on about 600 tons for the Peoples Bank, Lynchburg, Va. The Stewart department store, Balti-

more, 1,000 tons, is about to be awarded. A large tonnage of plates for an eastern steel maker is still under negotiation.

We quote delivered to consumers' plants in Philadelphia and vicinity: Sheared steel plates on contract 1.60c to 1.75c; universal steel plates on contract, 1.60c to 1.80c; sheared plates for early delivery, 1.75c to 1.80c; universal plates for early delivery 1.80c to 1.85c; structural shapes on contract 1.60c to 1.75c; structural shapes for early delivery 1.75c to 1.80c. Plates and shapes from store are quoted at 2.15c to 2.25c delivered.

Sheets.—Liberal bookings continue to be taken by eastern sheet makers and business is going freely at the full schedules representing 1.80c, Pittsburgh, or 1.95c, Philadelphia, for No. 10 blue annealed. Deliveries are still retreating.

We quote for delivery to consumer's plants in Philadelphia and vicinity, No. 10 gage blue annealed sheets at from 1.95c to 2.05c.

Semi-Finished Steel.—Consumers are still hounding makers for crude steel in eastern territory, but the latter find great difficulty in meeting new requirements except in small lots. In these cases, prices usually vary according to the circumstances, but sellers have little difficulty in obtaining what they care to ask.

We quote delivered to consumer's plants in Philadelphia and vicinity 4 x 4-inch open-hearth and Bessemer rolling billets at $28.50 to $30.50 and forging billets at from $34.50 to $38.50.

Old Material.—There is a shade of improvement, sentimentally, to the market, but new buying is not heavy, prices have not shown any recovery and, on the whole, are about stationary. Iron and steel rails, however, have sold lower and the railroad lists closing the past week brought lower prices generally than a month ago. Buyers of re-rolling rails have been offered round lots at $16.50, delivered. The Pennsylvania and other selling roads were able to obtain $16 or better along their line, which is about equivalent to the former price. The eastern scrap market appears to be in a waiting stage at present and does not seem likely to show improvement before a more pronounced demand is felt or supplies are lightened by more inclement weather.

We quote gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$18.00 to 18.50
Old steel rails (rerolling)	16.50 to 17.00
No. 1 heavy melting steel	15.00 to 15.50
Old car wheels	15.00 to 15.50
Old iron axles	25.00 to 26.00
Old steel axles	20.50 to 21.50
No. 1 railroad wrought	16.50 to 17.00
Wrought pipe	13.75 to 14.25
Cast borings	11.25 to 11.75
Machine shop turnings	11.25 to 11.75
Heavy cast (broken)	15.00 to 15.50
Malleable	13.50 to 14.00
Stove plate	11.50 to 12.00
No. 1 forge	13.50 to 14.00
Low phosphorus	19.50 to 20.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J., $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

BIRMINGHAM

Demand Desultory—Concessions Reported

Office of THE IRON TRADE REVIEW, Birmingham, Ala., Dec. 10.

Pig Iron.—Sales made in this market during the past week are smaller in the aggregate than those of the week previous, but the same level of prices was maintained. As a whole, the demand was of a rather desultory nature, and the indications are that the tonnage placed represents actual requirements only. The largest transactions recorded in the week involved 2,000 tons of high silicon, high manganese iron for delivery in January and February. This tonnage was sold at a basis of $15 per ton at Birmingham, and the same figures were paid for carload quantities of standard brands to be delivered as promptly as is practicable. For 500 tons of Nos. 2, 3 and 4 foundry, to be delivered in the first quarter, a basis of $14.50 per ton at Birmingham was the consideration. This last figure is no doubt the market price for first quarter deliveries, in strictly southern territory, but recent rumors to the effect that certain brands are obtainable in northern and eastern markets at a concession are very persistent. The $15 per ton Birmingham schedule is being adhered to for the second quarter by those concerns making quotations. Inquiry for this last, received in the week, involved some 5,000 to 7,500 tons, but so far, none of the several requirements is reported placed.

The matter of delivery against contracts already entered is still the prime consideration in the market. In this, the car situation gradually becomes more acute, while labor conditions are more unsatisfactory with the approach of the holidays and unfavorable weather. The aggregate movement from yards in this state during November was 3,000 tons more than the production during that time. Since Dec. 1, forwardings have probably been lighter, while the make has been increased by one additional furnace. Further addition to the make will hardly result this month, owing to a recent fire at a large ore mine, and the output until Jan. 1, will no doubt be represented by 16 active stacks on foundry iron, six active stacks on basic, and two active stacks on charcoal iron. Stock figures as of Dec. 1 compare with those of Nov. 1, as below:

	Nov. Tons.	Dec. Tons.
Free foundry	44,000	44,000
Warrant	29,500	27,000
Basic	3,500	3,000
	77,000	74,000

Quotations have not been changed on any of the several grades, and for the remainder of the year, and the first quarter, the schedule below is being adhered to, viz.:

For delivery during the remainder of this year and first quarter next:

No. 1 foundry	$14.50 to 15.00
No. 2 foundry	14.00 to 14.50
No. 3 foundry	13.75 to 14.25
No. 4 foundry	13.50 to 14.00
Gray forge	13.25 to 13.75
Basic	14.00 to 14.50
Charcoal	23.00 to 23.50

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

An advance of 50 cents per ton on the above is asked for deliveries in the second quarter, except for charcoal iron.

Old Material.—The feature of this market just at present is the demand for re-laying rails. A round tonnage of the material just mentioned was sold in the week, and the inquiry still pending is attractive. Sales of light cast and stove plate have recently been confined to carload quantities, but wrought and steel grades have moved in larger volume. Dealers' asking prices are very firm, and are about as follows, per gross ton, f. o. b. cars at Birmingham, viz.:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	15.50 to 16.00
Old iron rails	15.50 to 16.00
No. 1 R. R. wrought	13.00 to 13.50
No. 2 R. R. wrought	11.50 to 12.00
No. 1 country	10.00 to 10.50
No. 2 country	9.00 to 9.50
No. 1 machinery	11.50 to 12.00
No. 1 steel	11.00 to 11.50
Tram car wheels	11.00 to 11.50
Standard car wheels	13.00 to 13.50
Light cast and stove plate	10.00 to 10.50

Pushing New Furnaces

The Bethlehem Steel Co. is bending every effort to have some of the new open-hearth capacity it is now building in readiness for firing by the end of the first quarter of 1913. It aims to be able to put into service three of the new 50-ton furnaces about April 1.

The George Stant Machine Works, Connersville, Ind., has been incorporated with a capital stock of $30,000. The directors are George H. Stant, Kyle E. Stant and A. L. Stant.

NEW YORK

Heavy Specifying as Year Closes

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Dec. 10.

Iron Ore.—Eastern furnaces have been offering 8 cents per unit tidewater for lean Spanish ores running below 50 per cent in iron, but importers have declined to accept these propositions. It is not likely that any Spanish furnace ore could be obtained under 8¼ cents to 8½ cents per unit tidewater. There is very little activity at present in the eastern foreign ore market but some final odd lots of Wabana ore have been disposed of at the season's price of 7¼ cents per unit, tidewater. In the domestic market, sellers of local New York and New Jersey ores are holding for 8½ cents delivered eastern Pennsylvania and are making some sales on this basis. The announcement is made that Texas ores will probably be ready to be offered to the eastern trade shortly after the first of the year, as the mining plant of the Eastern Texas Brown Ore Development Co. is nearing final completion.

Pig Iron.—On every side the iron market shows a very quiet condition of trading in this territory. A few more melters have begun negotiations during the week calling for a somewhat larger total tonnage than in the preceding week, but the market in no sense shows any snap or action. As to be expected under the present quiet conditions, buyers are sounding out prices very thoroughly before closing, but they have been unsuccessful in obtaining any concessions on standard grades. Delaware river pipe makers who have taken 2,000 to 3,000 tons additional are understood to have obtained more attractive prices on low grade iron up to about $1 a ton, but this has usually applied to off lots which makers desire to clear from their yards. An up-state iron manufacturer has taken 7,000 tons of standard forge for third quarter shipment from a New York state maker, but the price is not stated. Generally makers do not care to go beyond the first half. A sale of less than 1,000 tons of eastern Pennsylvania No. 2 plain for first half is reported at full prices. A hoisting machine manufacturer is in the market and will probably take 1,000 to 1,500 tons of No. 2X for first half. A railway equipment maker is inquiring for 1,500 to 2,000 tons of a high and low silicon foundry iron for shipment over the next several months, 500 tons of which was for an eastern plant and the remainder for the Chicago district. A New England steel company which had been figuring on 6,000 tons of basic for first quarter, has decided not to buy at once. Standard No. 2X prices continue to be well maintained at the range of $18.25 to $18.50, tidewater, equivalent to $17.50 to $17.75, eastern Pennsylvania furnace. Virginia No. 2X is holding at $16.00, furnace, or $18.80, New York docks. We quote for prompt and first quarter shipment at New York tidewater, as follows:

Northern foundry No. 1	$18.50 to 18.75
Northern No. 2X foundry	18.25 to 18.50
Northern No. 2 plain	18.00 to 18.25
No. 2 Virginia	18.80 to 19.00
No. 2 southern foundry	18.50 to 18.75
Malleable	19.50 to 20.00
Gray forge	17.50 to 17.75

Ferro-Alloys.—All the principal sellers of ferro-manganese are now quoting $65, seaboard, for last half shipment, the several interests which were below this interest having come up to it in the week. Prior to these final advances, sales of 5,000 to 6,000 tons were done for last half, largely at the former price of $61, seaboard. A Canadian consumer took 1,000 tons and two Ohio buyers 500 tons each. For second quarter, some material has been offered at $65, seaboard, and the first half market ranges upward from this minimum. Prompt ferro-manganese is around $75, seaboard. The present inquiry includes one lot of 500 tons and totals about 1,000 tons. Fifty per cent ferro-silicon prices are very firmly maintained, as below:

We quote standard English 80 per cent ferro-manganese at $73 to $75, seaboard, for early shipment, $65 to $70, seaboard, for first half and $65 for second half; 50 per cent ferro-silicon on contract at $75, Pittsburgh or Philadelphia, for carloads, $74, for larger lots, and $73, for 600 tons or more.

Plates.—Leading railroad systems which have liberally been buying freight equipment, have paid practically 33 per cent advance over the price they were able to place freight cars during the depressed market conditions a year or more ago. At that time, car prices were abnormally low. New equipment purchases are fair. Apart from the Pennsylvania railroad purchase of 3,000 cars, reported elsewhere, the New York Central & Hudson River railroad ordered 1,000 hopper cars from the American Car & Foundry Co. This order brings the total purchases of the New York Central system to about 40,000 cars during the last 18 months. Heavy specifications for plates are pouring in upon makers against last quarter and last half contracts expiring Dec. 31. The far extended deliveries of the Pittsburgh mills show no improvement. Eastern makers continue to book liberally new business, usually for delivery within the first quarter at a 1.60c, Pittsburgh, minimum, or 1.76c, New York. Deliveries with these makers run from six to eight weeks. Prompt plates have been selling around 2 cents, Pittsburgh.

We quote, delivered at New York tidewater on going business, for last quarter or first quarter, 1.76c to 1.86c New York, on sheared plates. Some makers are asking $1 higher for universal plates. Plates from store are quoted at 2.15c.

Structural Shapes.—New awards for structural projects placed in the metropolitan and surrounding territory during the past week have reached about 15,000 tons, a fair week's total. Milliken Bros., Inc., have the Consolidated Gas Co. office building, this city, 5,500 to 6,000 tons; the American Bridge Co., it is now finally announced, will furnish 3,000 to 4,000 tons for the Cotton Exchange, this city, which will be erected by Post & McCord. The American Bridge Co. also has 500 tons for a building for the American Brass Co., Waterbury, Conn., and 1,100 tons for the Stewart department store, Baltimore; Levering & Gerrigues, 2,200 tons for the office building of the American Express Co., on lower Broadway; Barbour & Ross, 550 tons, for the Winecoff Hotel, Atlanta; the Gerber Engineering Co., 425 tons for a country club for Geo. C. Boldt, at Alexandria Bay, Thousand Islands; Boston Bridge Works, 350 tons for station canopies for the Boston & Maine railroad, at Lynn, Mass. The Raleigh, Charlotte & Southern has awarded 750 tons of additional bridg-

work, which it is reported has gone to the McClintic-Marshall Construction Co. Geo. A. Upham has the general contract for the New England Telephone building, Waterbury, Conn., 500 tons. An award on the Kaye loft building, Thirtieth street and Madison avenue, this city, 2,700 tons, is imminent. Bids go in Jan. 7 for a technical school, Toronto, 1,000 tons. Bids have been taken, but no awards have been made on the 6,000 tons for Boston pier improvements and 2,500 to 3,000 tons for an addition to the building of Arts and Sciences, Brooklyn. The St. Paul railroad is in the market for 29 deck plate girder spans. Eastern structural shape makers are firmly quoting 1.60c, Pittsburgh, or 1.76c, New York, and deliveries now fall in March and April. Middle western makers quoting 1.50c, Pittsburgh, have no tonnage at this price for many months.

We quote for New York delivery as follows: Structural shapes, 1.66c to 1.76c. Structural shapes from store, 2.15c.

Iron and Steel Bars.—The Carnegie Steel Co. has re-established the former differential of $2.00 a ton between steel bars and plates and shapes on Waverly warehouse prices by fixing the former product at a price of 2.05c, delivered, this territory. This adjustment represents an advance of $1.00 a ton. Plate and shape warehouse prices are not affected. Prompt steel bars remain very difficult to get. Bar iron is strong and active with many of the eastern mills filled up for some weeks. Its price continues at a minimum of 1.60c, eastern mill.

We quote for New York delivery, steel bars at 1.56c and common iron bars at 1.65c to 1.70c. Steel bars from store are quoted at 2.05c.

Cast Iron Pipe.—Heavy buying by water and gas companies for spring delivery became pronounced in the week and a round tonnage is pending, including one inquiry for 6,000 tons and several of 3,000 tons each. This buying is virtually a resumption of the heavy contracting for next year, which was done by private consumers up to election, but since then had subsided. Prices show a steady improvement. In public lettings, the Standard Cast Iron Pipe & Foundry Co. took 630 tons for New Bedford, Mass., and 825 tons for Washington, D. C., are believed to have gone to Virginia shops.

We quote six-inch pipe at from $24 to $26, f. o. b. New York, in carload lots.

Rails and Track Material. — The Philadelphia & Reading railroad announces the distribution of its recent rail order as 10,000 tons to the Pennsylvania Steel Co.; 5,000 tons each to the Lackawanna and Bethlehem Steel companies, and 4,000 tons to the Carnegie Steel Co., or a total of 24,000 tons, which is about its normal annual purchase. The Pittsburgh & Lake Erie railroad has formally closed with the Carnegie Steel Co. upon the order for 12,000 tons of rails which had previously been announced. The total purchases of the New York Central Lines for next year are now well defined at from 165,000 to 170,000 tons. The Southern Pacific is reported to have placed an additional order for 30,000 tons. A good part of this came to eastern makers. The Denver City Tramway and the Milwaukee Electric Railroad Co. are inquiring for 500 tons of girder rails each. There is a very liberal inquiry for switch and frog work, about 15 different roads being in the market.

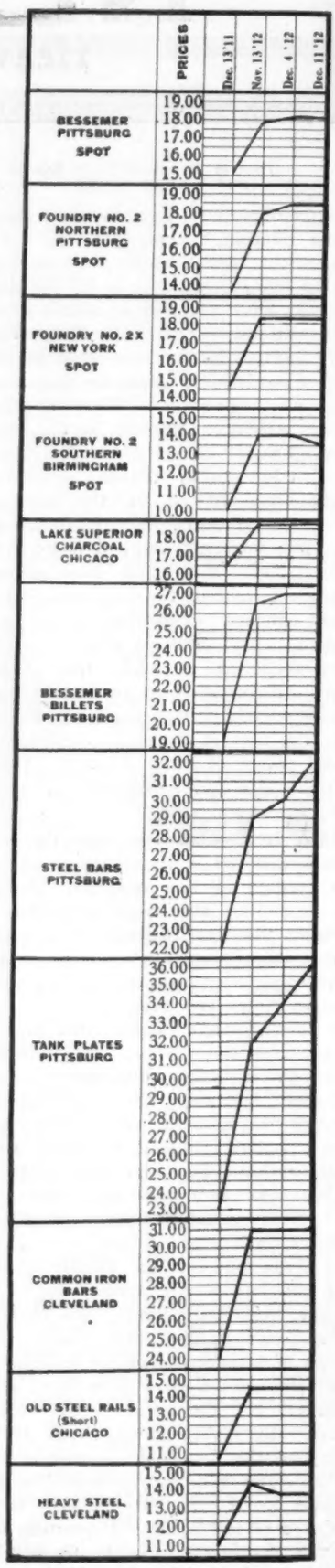
Old Material. — Favorable weather conditions are resulting in a heavy movement of old material to consumers against old orders and shipments have become so congested at several points that embargoes are threatened. These conditions prevail at Pottsville, Ivy Rock and other eastern Pennsylvania points. New buying is light and the tone of the market continues weak. Reports of heavy melting steel below $15.00, eastern Pennsylvania are to be heard, but these seem to apply to material under pressure to be moved and of not strictly first quality. Considerable demand for car wheels for export is current and offers of $15.50, New York, for such shipment were made on round lots this week. Steel shafting is selling around $19.00, eastern Pennsylvania. Some local demand for borings and turnings is supporting that market. Only one bid, and that an irregular one, was received for the large stock aggregating 45,000 to 50,000 tons offered by the Albany Waste & Metal Co., Albany, N. Y., during the past week. Accordingly, this accumulation will be again offered at a later date. We quote, gross tons, prices New York dealers will pay at tidewater, as follows:

Old car wheels	$13.50 to 13.75
Old iron axles	22.00 to 22.50
Steel axles	17.00 to 17.50
Old steel shafting	16.50 to 17.00
No. 1 heavy melting steel	12.50 to 13.00
No. 1 R. R. wrought	14.25 to 14.50
Wrought pipe (not galvanized)	11.00 to 11.25
Cast borings	9.50 to 10.00
Machine shop turnings	9.75 to 10.00
Heavy cast	12.00 to 12.50
R. R. malleable	10.50 to 10.75
Stove plate	9.25 to 9.50
Grate bars	8.25 to 8.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York

The power plant of the New York Leather Belting Co., at Brooklyn, N. Y., has been more than doubled and the heating system enlarged.

PRICE CHART



BUFFALO

Good Tonnage of Pig Iron Sold

Office of THE IRON TRADE REVIEW,
Buffalo, Dec. 10.

Pig Iron.—Hang-fire orders came into the market during the week, swelling the placement to 30,000 tons of all grades. In addition to this, there is an unusual number of inquiries for small amounts, aggregating a considerable tonnage. Prices remain the same, being rigidly maintained by all of the furnaces in the district. Apparently there is no inclination on the part of the producers to advance prices at this time beyond the present range. This situation is actuated more by policy than by supply and demand. Continued favorable weather has made it possible to go on with production to the limit of the stacks in blast, adding greatly to the output from this section. Heavy specifying, to get out full quotas before the end of the year and the quarter, has made shipments exceedingly heavy, limited only by the capacity of the furnaces and the ability of the roads to supply cars. The shortage of cars has been the only factor to impede shipments. This latter factor is becoming serious. Some of the furnaces are taking on a little new business where able, but others are virtually out of the market. The producers say the outlook for next year is very promising and that the shortage of cars is the only visible dark cloud.

The range of prices for the week is substantially as follows, f. o. b. Buffalo:

No. 1X foundry	$18.00 to 18.25
No. 2X foundry	17.75 to 18.00
No. 2 plain	17.50 to 17.75
No. 3 foundry	17.25 to 17.50
Gray forge	17.00 to 17.25
Malleable	17.75 to 18.25
Basic	18.00 to 18.25
*Charcoal	18.25 to 19.25
*Some grades and brands	22.00

Finished Material.—Prices remain the same. While one of the local jobbers is now asking 2.30c, base, on structurals and an eastern Pennsylvania mill is quoting 1.75c on the same material, for prompt shipments from the mill's rollings, there is no disposition on the part of the larger interests and agencies in the district to make advances beyond the rigid prices of 1.40c, base, on bars and small shapes, and 1.50c, base, on shapes and plates, for forward delivery. New business has practically ceased to be a factor in the market because the majority of the consumers are now aware of the sold-up condition of the mills and are making no attempts to place additional requirements for nearby or extended periods. Specifications continue to pour in. The volume is heavy and is expected to continue so until the end of the year from customers who want to get all the possible tonnage they can upon the mill books, before the expiration of contracts with the turn of the year. Heavy specifying is also being done by the consumers who want their next year's requirements entered, where they were fortunate enough to get under cover by contracting some time ago. There is little or no improvement in the delivery situation. The mills are back now to a point where there is little likelihood of their books being opened until they are ready to negotiate for the last half of next year's business, and the indications now are that that will not be until the close of the first quarter.

Old Material.—The only change in the market over last week has been a stiffening in the price of heavy melting steel and in old car wheels, as noted below. Buying has been sporadic and only where consumers could secure advantageous prices on the material they wanted. The dealers, on the other hand, are not inclined to shade prices, but are adhering to schedules and waiting for a revival of buying, which some of them indicate may not materialize for another month. The range for the week, for gross tons, f. o. b. Buffalo, is as follows:

Heavy melting steel	$14.75 to 15.50
No. 1 railroad wrought scrap	15.50 to 16.00
No. 1 R. R. and mch. cast sc'p	13.75 to 14.25
Old steel axles	15.75 to 16.50
Iron axles	23.25 to 23.75
Car wheels	16.00 to 16.75
Railroad malleable scrap	13.50 to 14.00
Wr'ght iron and soft steel turn.	8.75 to 9.00
Cast iron borings	8.00 to 8.50
Low phosphorus steel scrap	16.75 to 17.25
Old iron rails	15.25 to 15.75
Tank iron	10.50 to 11.00
Boiler plate, sheared	14.75 to 15.25
Pipe and tank	10.25 to 10.75
Stove plate	11.25 to 11.75
Sheet iron	7.75 to 8.25
Locomotive grate bars	11.50 to 12.00

ST. LOUIS

Inquiry for Northern Basic

Office of THE IRON TRADE REVIEW,
St. Louis, Dec. 10.

Pig Iron.—An inquiry for 5,000 tons of northern basic for delivery over the first half of next year, is about the most interesting feature of the market in the St. Louis territory. Sales last week included 400 tons of southern 4.5 per cent silicon, 200 tons of southern No. 2, 1,500 tons of 4.5 per cent silicon for delivery over the whole of next year, and a fair tonnage of small orders. Southern No. 2 is quoted at $13.50, $14.50 and $15, the lowest price being for spot shipment. Northern iron is held at $18, f. o. b. Chicago furnace, and at $16.50 to $17, Ironton.

Prices for first quarter and first half on southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$18.25 to 19.25
Southern No. 2	17.75 to 18.75
Southern No. 3	17.50 to 18.50
Southern No. 4	17.25 to 18.25

Old Material.—The market for old materials is quiet here. Prices remain unchanged as follows:

Gross Tons

Old car wheels	$15.00 to 15.50
Old iron rails	15.50 to 16.00
Rerolling rails (5 ft. and over)	16.00 to 16.50
Old steel rails (3 ft. and und.)	14.50 to 15.00
Light section relayers (45 lbs. and under, subject to inspec.)	24.00 to 25.00
Relaying rails, subject to insp.	24.00 to 25.00
Frogs, switches and guards cut apart	15.00 to 15.25
Heavy melting steel	14.75 to 15.25
Shoveling steel	12.50 to 13.00

Net Tons

No. 1 railroad wrought	$13.00 to 13.50
No. 2 railroad wrought	12.50 to 13.00
Arch bars and transoms	15.50 to 16.00
Knuckles, couplers and springs	12.50 to 12.75
Shafting	17.00 to 17.50
Iron car axles	20.00 to 21.00
Steel car axles	17.50 to 18.00
Locomotive tires	13.50 to 14.00
Pipes and flues	9.00 to 9.50
Tank iron and cut boilers	9.00 to 9.50
No. 1 cut busheling	11.00 to 11.50
No. 2 cut busheling	9.50 to 10.00
Cast and mixed borings	7.25 to 7.75
Machine shop turnings	8.75 to 9.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	10.50 to 11.00
Stove plates	10.00 to 10.50
Angle splice bars (iron)	13.50 to 14.00
Angle splice bars (steel)	12.50 to 12.75

Dismantling Plant.—Efforts to purchase the Tudor works of the Republic Iron & Steel Co., in East St. Louis, having failed, dismantling of the plant has begun. The plant has been closed since July 1, last. There will be about 5,000 tons of machinery and equipment to be disposed of.

A voluntary petition in bankruptcy was filed in the Detroit circuit court at Detroit on Dec. 6, by the Lion Motor Car Co., Adrian, Mich.

METAL MARKETS

Copper Quiet—Fewer Tin Sales

Chicago

Dec. 9.

New Metals.—The market for new metals in this territory is weak, lead and spelter remaining unchanged and copper being shaded ⅛ cent.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 17⅜c; casting, 17¼c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 7.35c; lead, desilverized, 4.55c; sheet zinc, 9c, f. o. b. Lasalle, in car lots of 600-pound casks; pig tin, 49.40c; Cookson's antimony, 10½c; other grades, 9⅛c.

Old Metals.—The market for old metals remains unchanged, the demand having decreased somewhat in the last few days.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, crucible sheets, 17c; copper bottoms, 14½c; heavy red brass, 13¼c; heavy yellow brass, 10¼c; No. 1 red brass borings, 12½c; No. 1 yellow brass borings, 9.25c; brass clippings, 10½c; lead pipe, 4½c; zinc scrap, 5½c; tea lead, 4c; No. 1 aluminum, 20c; No. 1 pewter, 36c; block tin pipe, 47c; tin foil, 40c; linotype dross, 3½c; stereotype plates, 4c; stereotype dross, 3.50c; prime slab zinc dross, $131 a ton.

New York

Dec. 10.

Copper.—The November copper statistics, given out Monday, although better than had been looked for by the trade have not excited a renewal of buying by consumers. It had been generally expected that stocks would increase 15,000,000 or 20,000,000 pounds in November, whereas the actual increase is only 9,419,095 pounds. Production was 134,695,440 pounds, compared with 145,405,453 pounds in October; deliveries into domestic consumption amounted to 69,369,795 pounds, and for export 55,906,550, compared with 84,104,734 pounds and 47,621,342 pounds, respectively for the previous month. Stocks at refining plants as of Dec. 1, rose to 86,164,059 pounds. Business continues quiet, with considerable metal being offered in the open market at from 17.35c to 17.40c, cash, New York. The leading sellers have not changed their quotations, but it is acknowledged that no business is being done at the higher levels. Lake is nominally 17.62½c to 17.75c. Exports of copper since Dec. 1, are 8,076 tons.

Tin.—Sales during the past week do not compare favorably with the amount of business transacted the previous week. Consumers and dealers alike, have shown little interest in the metal, having bought supplies to meet present requirements. Spot and December deliveries fluctuated between 49.40c and 49.25c and closed at the low figure today.

Lead.—There is keen competition for business between independent sellers and the American Smelting & Refining Co. The second cut made by the latter during the past two weeks came to light Dec. 3, when sales were made at 4.35c, for shipment to New York. The market is now quoted at from 4.35c to 4.40c, with only a small amount of business in sight.

Spelter.—Greater pressure to sell has been noticeable in the spelter market, and prices are easier. Prime western is offered at 7.40c, in New York, for spot, and December delivery. More advanced positions are from 5 to 10 points lower.

Antimony.—There is no change in antimony, dealers continuing to sell under the importers' prices. Cookson's is 10.25c; Hallett's is 9.75c and Chinese and Hungarian are 9c to 9.20c.

Leading Manufacturers Confer

An important conference of prominent iron and steel manufacturers took place Dec. 9 at the office of the American Iron and Steel Association in Philadelphia. It was attended by Hon. E. H. Gary, president of the American Iron and Steel Institute, Charles M. Schwab, president of the Bethlehem Steel Co., E. A. S. Clarke, president of the Lackawanna Steel Co., E. C. Felton, president of the Pennsylvania Steel Co., Powell Stackhouse, president of the Cambria Iron Co., and J. G. Butler Jr., vice president of the Brier Hill Steel Co. James M. Swank, general manager of the American Iron and Steel Association, and Hon. James T. McCleary, secretary of the American Iron and Steel Institute, also participated in the conference. An authorized statement of the conclusions reached at the conference will be issued in a few days. The result of the conference will be entirely satisfactory to the American iron trade.

REOPEN BENSON MINES

Important New York Deposits Being Developed by New Mill and Work.

Mining and concentrating operations were started the past week at a newly built plant upon the magnetite iron ore properties of the Benson Mines Co., at Benson Mines, New York. These deposits are located in St. Lawrence county, 40 miles east of Carthage, on the Carthage & Adirondack branch of the New York Central railroad. A large body of ore running about 30 per cent in iron, natural, has been blocked out, and the vein shows a width of upwards of 150 feet. The company has just built a large modern concentrating mill, which has a capacity of producing about 400 tons daily. Much of the present plant has a capacity for double that amount and to greatly increase the output, it will require that only a portion of the present equipment be duplicated. The concentrates are Bessemer quality, running approximately 64 per cent in metallic iron, 7 per cent in silica and 0.04 per cent in phosphorus.

Mining of the ore is being done by the open pit and steam shovel method. Deep holes are drilled along the face of the hard rock structure containing the ore and the material is dislodged by dynamite. It is then picked up by steam shovel and passed to the primary rolls of the Edison type, which are capable of handling single pieces up to 6 tons in weight. The power for the enterprise is supplied from a newly developed water power at a point on the Oswegatchie river, 4½ miles from the ore deposit. This water power has a head between 250 and 300 feet, which it is estimated may ultimately develop about 8,000 horsepower. At present only about 50 feet are being utilized.

The development of the Benson mines began in the early 90's, when a concentrating mill was built and from time to time ore has been produced. The revived development is being handled, however, on a more complete and vigorous scale than ever before. Pilling & Crane, Philadelphia, are now offering the product of the mine to the eastern market.

MANY BUILDINGS

Are Being Planned in Buffalo—Structural Steel Requirements.

Buffalo, Dec. 10.—The Buffalo public general hospital commission, created by act of the legislature, and appointed by the mayor, with Dr. Edward J. Meyer president, is proceeding with plans to build a group of hospital pavilions, administration building, power plant and other needed structures on an 81-acre site recently purchased by the city. The general plan is now nearing completion, in the hands of Green & Wicks, architects, Buffalo. It is proposed to erect the 300-bed tuberculosis pavilion, or pavilions, in the spring, at an estimated cost of $600,000, and the initial part of a unit power plant. The remaining buildings are to be erected within several years, the total costing at least $1,500,000. The various pavilions for general, contagious diseases, tuberculosis, detention, maternity and other needs; the administration building, power plant and all to be of the most modern type, requiring a large tonnage of structural material. The commission announces that the plans in the hands of the architects will soon be ready for approval and the taking of bids.

Colson & Hudson, architects, are revising plans for the Federated Jewish Charities Settlement House, requiring about 100 tons. James Stewart & Co., Chicago, have been awarded the general contract for the Washburn-Crosby Co.'s 2,000,000-bushel reinforced concrete elevator, Buffalo, requiring structural material for working house and conveyor bridges. Bids will be taken for the steel in the warehouse addition to the Barcalo Mfg. Co.'s plant, Buffalo, 100 tons.

The city of Buffalo, bureau of buildings, has rejected bids and ordered revision to reduce cost on Masten Park high school, 1,500 tons; grammar schools No. 28 and No. 57, taking 200 tons each.

Heavy Production at Steelton

Harrisburg, Pa., Dec. 10.—Work at the plant of the Pennsylvania Steel Co., at Steelton, near here, for the month of November, shows a large gain over the corresponding month of 1911. The output last month was very heavy, and the production of the rail mill alone doubled that for the same month last year. The openhearths and other departments showed a large excess for the corresponding period in 1911. During the past week, the output of the iron foundry was interfered with owing to the removal of machinery to the new foundry, but the steel foundry is being operated to its full capacity and the output for the week just closed was above the average.

The scarcity of labor is still an item at the Steelton plant and considerable outside work is being held up on this account.

In the distribution of the Reading's recent steel rail order of 24,000 tons for 1913 delivery, the Pennsylvania Steel Co. obtained 10,000 tons.

RAILROADS FILE

Application With New York Commission to Allow Equipment Trust.

The New York Central & Hudson River and the Lake Shore & Michigan Southern railroads have filed an application with the state public service commission of New York for its approval of an equipment trust agreement for 1913 and the issuance thereunder of trust certificates amounting to $12,547,000. The proceeds of these certificates will be applied to the purchase for the New York Central Line proper of 20 passenger locomotives, 30 freight locomotives, three suburban locomotives, 50 switching locomotives, 1,000 hopper cars and 40 steel baggage cars; for the Lake Shore & Michigan Southern, 20 freight locomotives, 15 steel baggage cars and 15 steel passenger coaches; for the Michigan Central, 20 passenger locomotives, 20 switching locomotives, 20 steel baggage cars; for the C., C., C. & St. L., 1,000 general service cars; for the Pittsburgh & Lake Erie, 2,000 gondola cars and 2,000 hopper cars, and for the Toledo & Ohio Central, 1,000 hopper cars. A number of these purchases have already been closed, including especially the 1,000 cars for the New York Central proper and the 4,000 cars for the Pittsburgh & Lake Erie, in addition to a number of the other railroads.

Locomotive Buying Brisk

Locomotive orders continue to be placed very liberally by the railroads. The Santa Fe railroad system has placed an order with the Baldwin Locomotive Works for 45 locomotives and the Delaware, Lackawanna & Western railroad has awarded 23 locomotives to the American Locomotive Co. The latter builder has also taken seven superheater Pacific type locomotives for the Southern Railway Co.

SUBSTANTIAL GAIN

Shown by Corporation Unfilled Bookings in Month of November.

A further increase of 258,502 tons in its booked orders was netted from its operations during November by the United States Steel Corporation according to the monthly announcement made at New York Tuesday. The unfilled business on hand Nov. 30 was 7,852,883 tons, compared with 7,594,381 tons on Oct. 31. This accumulation of business has been exceeded in only three previous reports, those of the quarters ended March 31, 1907, Dec. 31, 1906, and Sept. 30, 1906, and on these occasions inter-company tonnage was included. The high mark in the Corporation's history was at the close of the quarter ended Dec. 31, 1906, when 8,489,718 tons were on hand.

Since the plan of making monthly statements of unfilled tonnage has been followed by the Corporation, the statements of business on hand, the tonnage and percentages of increase or decline from the previous month, have been as follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Nov. 30, 1912....	7,852,883	258,502	3.40+
Oct. 31, 1912....	7.594,381	1,042,874+	15.33+
Sept. 30, 1912....	6,551,507	388,132+	6.29+
Aug. 31, 1912....	6,163,375	206.296+	3.46+
July 31, 1912....	5 957,079	149.773+	2.58+
June 30, 1912....	5,807,346	56 363—	0.98+
May 31, 1912....	5,750,983	86,983+	1.52+
Apr. 30, 1912....	5 664.885	360,044+	6.97+
Mar. 31, 1912....	5.304,841	149,359—	2.79—
Feb. 29, 1912....	5 454,200	74,479+	1.38+
Jan. 31, 1912....	5,379,721	294,960+	5.71+
Dec. 31, 1911....	5,084,761	942 806+	23.24+
Nov. 30, 1911....	4,141,955	447.627+	12.06+
Oct. 31, 1911....	3,694,328	83 011+	2.25+
Sept. 30, 1911....	3,611,317	84.668—	2.34—
Aug. 31, 1911....	3 695,985	111,900+	3.33+
July 31, 1911....	3.584,085	223,027+	7.16+
June 30, 1911....	3 361,058	247,871+	7.96+
May 31, 1911....	3.113,187	105,617—	3.28—
Apr. 30, 1911....	3,218.704	228 597—	6.63—
Mar. 31, 1911....	3,447,301	46.758+	1.37+
Feb. 28, 1911....	3,400,543	289 624+	9.31+
Jan. 31, 1911....	3,110,919	436.162+	16.30+
Dec. 31, 1910....	2 674,757	85,656—	3.09—
Nov. 30, 1910....	2 760,413	111,536—	3.88—
Oct. 31, 1910....	2 871,949	286,157—	9.12—
Sept. 30, 1910....	3.159,106	379,088—	10.74—
Aug. 31, 1910....	3,537,128	433 803—	10.92—
July 31, 1910....	3,910,931	286,863—	6.72—

New Calendars

The Universal Portland Cement Co., Chicago, has issued a very artistic calendar for December, 1912, and the year 1913. The halftone engravings show the varied uses of concrete, including office buildings, grain tanks, roads, viaducts, walls, locks and dams, residences, manufacturing plants, churches and other structures. The calendar sells for 25 cents.

The 1913 calendar of the Treadwell Construction Co., Midland, Pa., is well printed, with large, plain figures. Each month shows a different form of construction of this company, including tanks, penstocks, stand pipes, blast furnace ladles and steel cylinders.

BANQUET TENDERED

To Steel Leaders by Business Men of Johnstown, Pa.

Leading business and professional men of Johnstown, Pa., tendered a testimonial banquet on Thursday evening to James A. Farrell, president of the United States Steel Corporation; William H. Donner, president of the Cambria Steel Co.; Daniel Coolidge, president of the Lorain Steel Co., and Vice President John A. Reis, of the United States Steel Corporation. The keynote of the evening, as expressed in the remarks of various speakers, was the development of Johnstown as a steel center and the good will of the city toward the companies and corporation engaged in the steel trade.

President Farrell, in his address, spoke of the important position Cambria county has held in the historic development of the iron and steel industry, both as a steel manufacturing center and as the producer of many successful iron and steel men.

With reference to the present prosperous conditions existing in all lines and branches of business, he said:

"It has long been true that the country's prosperity is largely dependent upon the prosperity of the steel industry, and this has never been more potent than during the year now drawing to a close, when, from all parts of the country have come reports of such prosperous conditions as have seldom before been known; practically every steel production record has been broken, and new high figures of domestic and export consumption reached. The earning power of millions of workmen in the steel mills, railroads, car shops and a hundred affiliated lines, invariably affected by conditions in the steel industry, has been enhanced. The heavy volume of traffic caused a serious shortage of rolling stock and resulted in increased equipment and facilities; prices of iron and steel products, despite the extraordinary demand, have been kept to a fair level, and the mills have accumulated the greatest volume of unfilled orders in their history, presaging prosperous times for many months to come.

"Good crops and a large foreign trade—two of the principal contributory causes of good times—enable us to approach the year 1913 confident that it will prove even more active than the one through which we are passing, which will become famous in history as a year of marked progress and universal prosperity."

Daniel Coolidge, president of the Lorain Steel Co., expressed sincere thanks for the honor conferred upon him by the testimonial, but excused himself from making a formal address.

President Donner, of the Cambria Steel Co., said in part:

"Your city has shown a most remarkable increase. I think its prosperity has been largely due to its freedom from labor troubles and because its citizens own their own homes and are directly interested in the welfare of the community.

"Several of your business men have asked me what effect I think the Democratic administration will have upon your industries. I have no fear of disastrous results, because I have every confidence in President-elect Wilson, and do not believe that our new president or the next congress will knowingly permit anything to be done which will injure the steel industry or any other lines of business. I believe that the entire responsibility of the tariff in the hands of the Democratic party will make them very much more conservative and careful than if the whole responsibility did not rest with them. I cannot conceive how any consumer can legitimately claim that he is being injured by the tariff on steel."

FOREIGN INQUIRY

Includes Large Tonnages of Railroad Materials.

New York, Dec. 11. (By wire.)—There is very heavy inquiry for rails and track supplies and other steel material in the market for South America. Railroad there are finding it difficult to get rails from English or German mills until well toward the close of next year. The Central Railroad of Brazil is inquiring for 100,000 tons, and the Argentine railway is also out for 100,000 tons.

A large order of line pipe for the Roumanian government, taken by the United States Steel Products Co., amounts to 35,000 tons.

Will Hold Annual Meeting

The annual fall meeting and banquet of the Cleveland branch of the National Metal Trades Association will be held in Cleveland, Dec. 17, at the Hotel Statler. The banquet this year is in honor of Henry D. Sharpe, president of the Brown & Sharpe Mfg. Co., Providence, R. I., and president of the association.

LARGE BASIC ORDER

Placed by a Pittsburgh Steel Company For Six Months.

Pittsburgh, Dec. 11. (By wire.)—It is unofficially advised that a Pittsburgh consumer has closed for 35,000 tons of basic pig iron for next six months' shipment. Most of the iron involved will be shipped by Youngstown interests. It is understood that 5,000 tons will be delivered this month at $17, valley. The remaining 30,000 tons were obtained at $16.35, valley, according to reports current in the trade.

A number of blast furnace interests have been able to obtain as high as $18, valley, for small lots of prompt foundry iron. The general market for foundry iron, however, has not gone above $17.50, valley, it is generally believed.

Death of Alfred P. Bolter

New York, Dec. 11. (By wire.)—Alfred P. Bolter, president of the American Institute of Consulting Engineers, vice president of the American Society of Civil Engineers, and a well-known bridge builder, died at East Orange, N. J., Dec. 9, aged 73. He was a native of Philadelphia, and was educated at the University of Pennsylvania. Mr. Bolter was engaged in the iron business from 1865 to 1870, with Samuel Milliken, as New York agent of the Phoenix Iron Co. Then for 20 years he was vice president and engineer of the Phillipsburg Mfg. Co. He later served as consulting engineer for railroad building in Cuba, Mexico, Hayti and was chief engineer in charge of construction of the Manhattan Elevated railroad. He was also consulting engineer for the Singer and Metropolitan buildings, New York City.

George Burnham Sr., an associate of Mathis W. Baldwin in founding the Baldwin Locomotive Works, died at Philadelphia, yesterday. He was for 73 years connected continuously with the works, but has been out of the active management for the past 20 years.

Consolidate Can Companies

New York, Dec. 11. (By wire.)—The Consolidated Can Co. has been organized to amalgamate the Continental Can Co., Export & Domestic Can Co. and the Standard Tin Plate Co., with a capital of $7,500,000 preferred and $10,000,000 common, under a New Jersey charter.

Electric Furnace Methods of Steel Production--V

Features of the Keller Refining Medium, With Particular Reference to the Operation of the Electrodes and Construction of the Hearth

By John B C. Kershaw

C. A. Keller, head of the well-known French firm of Keller, Leleux & Co., manufacturers of calcium carbide and ferro-alloys, has designed two distinct types of electric refining furnaces for steel production. The earliest type was equipped with two or more electrodes in series, while the latest type is provided with a compound conducting hearth. The earlier furnace resembles somewhat the Heroult refining medium, and in design and construction, the latter type is somewhat similar to the Girod furnace. The first Keller furnace built consisted of a stationary steel plate chamber, lined with basic refractory material, and it was heated by two large carbon electrodes suspended vertically over the metal bath. These electrodes merely touched the surface of the molten slag, but did not extend into the bath underneath the slag covering. A furnace of this type was built at Kerrousse, France, in 1902, and was operated experimentally for several months. It had a capacity of 800 kilograms and later was removed to the works of the Keller, Leleux & Co., at Livet, France. In 1904 a trial run of this electric furnace was made at this plant by the members of a Canadian commission, but the test never was successfully completed.

The experience gained at Kerrousse and Livet in the application of this type of steel refining led to the erection, in 1905, of an 8,000-kilogram furnace at the steel works of Jacob Holtzer & Co., Unieux, France. It is claimed by Keller that this installation marked the first introduction of an electric furnace in a modern steel plant and even if this claim is not justified, Keller appears to have been the first electro-metallurgist to recognize that the electric furnace could be most successfully and economically employed for the final stages of steel-making rather than for the whole process. During the experiments at Livet, the furnace was charged with molten metal in place of cold scrap and at Unieux this system of operation has been developed further.

A sectional view of the Keller furnace at Unieux is shown in Fig. 10, and Fig. 12 is a diagrammatic plan view of this furnace, which is of the four-pole type, and weighs, with its equipment, 50 tons. The melting chamber is mounted on rollers and is provided with an hydraulic tilting device. For handling electrodes, four rotating supports were installed. These supports are independent of the furnace, and the electrodes, when turned toward the furnace, connect with a central block, where they contact with the electric supply mains. By this system, four zones of heat are produced in the furnace and the current flowing through each pair of electrodes can be controlled independently. The vertical movement of the electrodes likewise is independently controlled. The method of current distribution to the eight electrodes is designed to reduce the induction losses to a minimum and to permit of the removal and the renewal of the carbon electrodes without stopping the furnace. The furnace hearth is lined with magnesia and is so mounted that

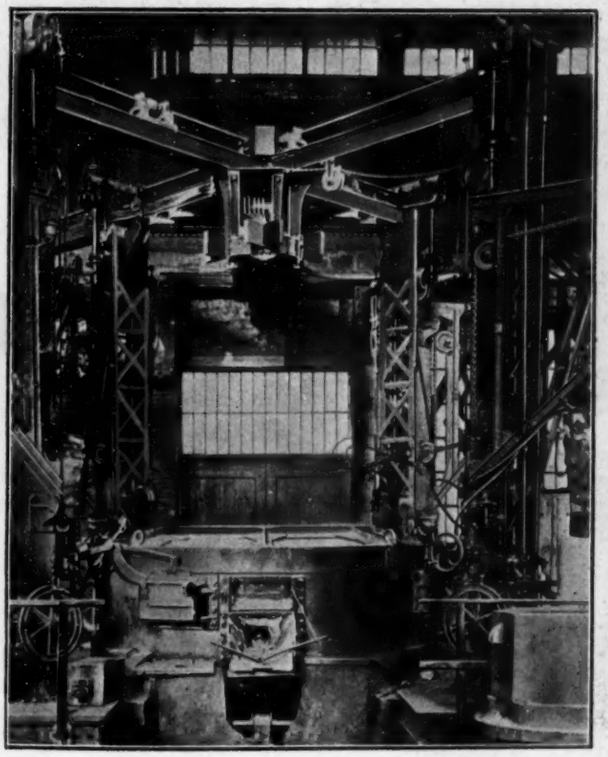


FIG. 1—KELLER FURNACE IN THE JACOB HOLTZER STEEL PLANT, UNIEUX, FRANCE

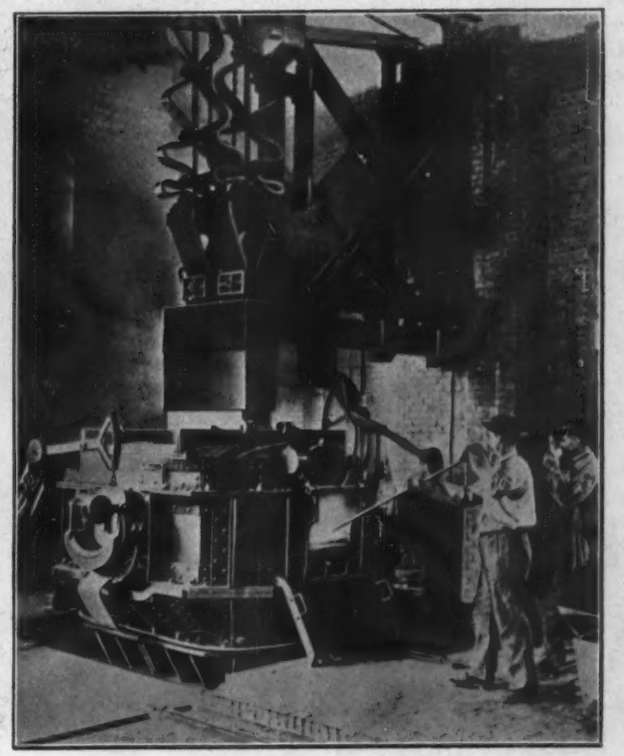


FIG. 2—VIEW OF A KELLER FURNACE IN OPERATION

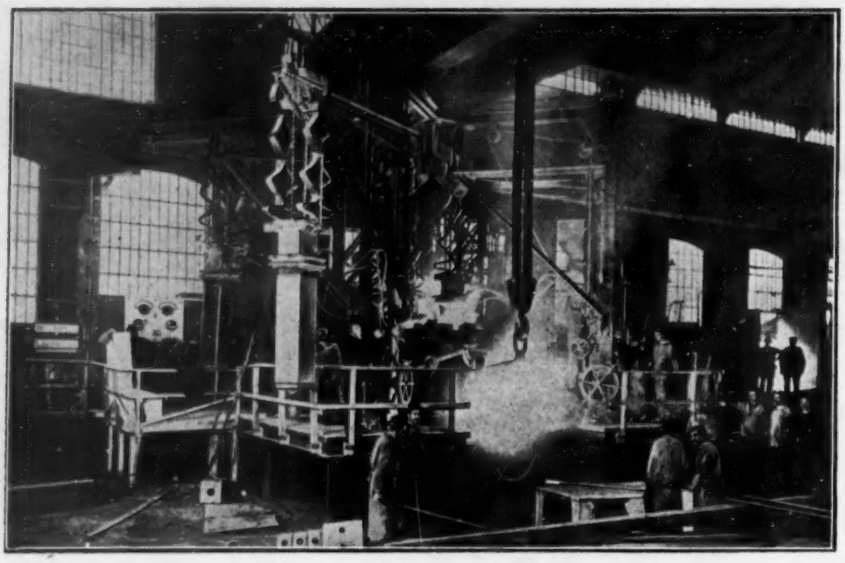


FIG. 3—TAPPING A KELLER ELECTRIC FURNACE

it can be tilted either forward or backward. The gas generated during the refining process accumulates in the furnace, where it is retained, thereby excluding air and preventing the oxidation of the steel.

Operating Costs

At Unieux, charging molten metal into the electric furnace, the refining operation requires approximately two hours and 45 minutes, and for refining 7,500 kilograms of molten metal charged, the power consumption was only 750 kilowatts. The metal charged into the furnace contained carbon, 0.15 per cent; sulphur, 0.06 per cent, and phosphorus, 0.007 per cent. It was desired to obtain a steel containing carbon from 0.45 to 0.50 per cent, and the steel, when refined, contained carbon, 0.443 per cent; sulphur, 0.009 per cent, and phosphorus, 0.008 per cent. The electrode consumption averaged about $1 per ton of steel.

The installation at Unieux appears to be the only one, aside from the one at the inventor's own works at Livet, which included a furnace of the earlier type. The latter developments involve furnaces provided with conducting hearths. The bottom of a furnace of this type is a block, which consists of metal and refractory material. This block is practically infusible at all operating temperatures in the furnace. Iron bars are placed vertically and at regular intervals in the furnace bottom and a magnesia clay is rammed closely, when hot, between each group of four rods. The clay is rammed in position, and an extremely compact mass, composed of iron and refractory clay, in regularly alternating layers, is obtained. At high temperatures, both the refractory material and the bars are good conductors of electric current and the lower conducting base, as well as all of the iron bars, are connected to one of the poles of the source of energy.

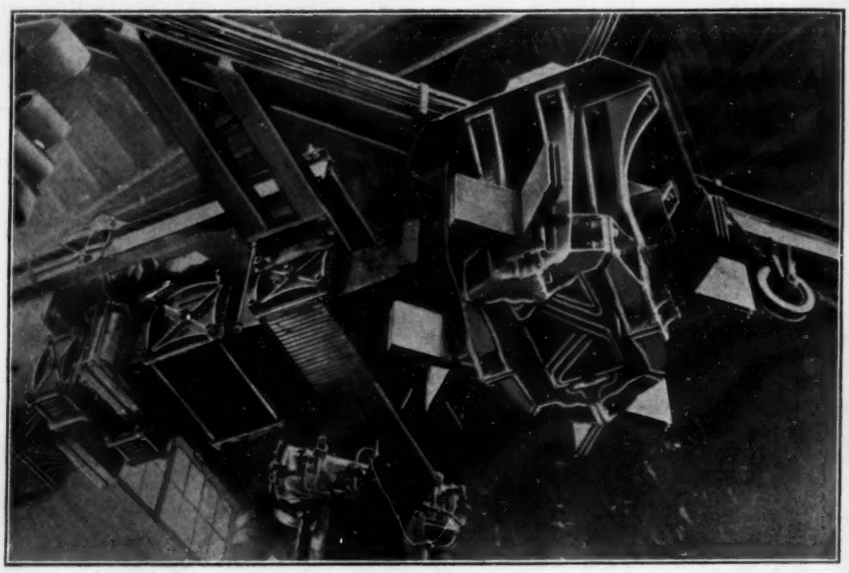


FIG. 5—THE ELECTRIC CONNECTIONS FOR THE ELECTRODE, SUSPENDED ABOVE THE FURNACE

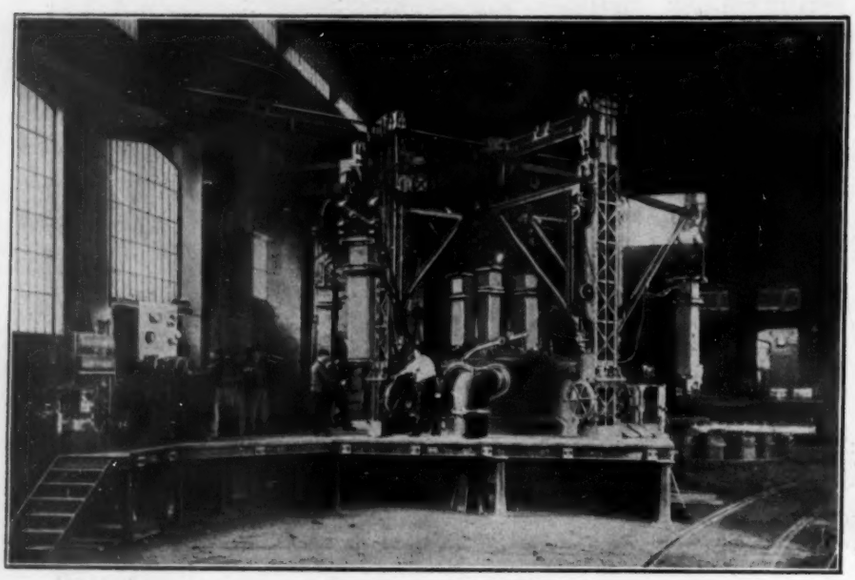


FIG. 4—ANOTHER VIEW OF THE KELLER FURNACE AT UNIEUX

The conducting hearth permits the furnace to be started easily, as the bottom is a conductor throughout its entire transverse section by reason of the iron bars which it contains. The small distance between the bars and the conductivity of the clay puts them in parallel throughout their length when the furnace is being started, and, therefore, the current is distributed equally over the entire surface of the hearth. The current, when leaving the upper electrode, crosses the whole section of the molten metal.

It is claimed that the electrical resistance of such a conducting hearth

is practically negligible, owing to the large number of iron bars used in the furnace bottom. The employment of metal conductors of small section insures a more rational distribution of the alternating current than the employment of bars of larger section. The conducting hearth forms the bottom of the melting chamber, which is double-lined with basic refractory material. The melting chamber is conical in form and to provide a solid foundation, a basin of magnesia clay is placed at the bottom of the furnace. The furnace casing is cooled to a level of the upper part of the hearth to

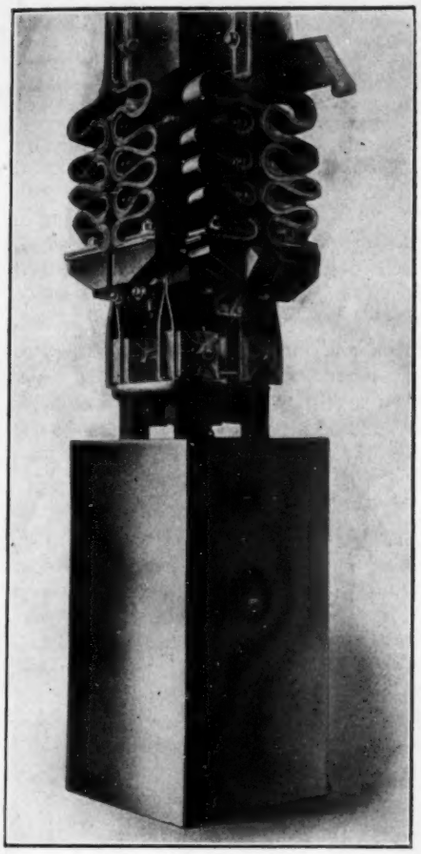


FIG. 6—KELLER METHOD OF SUSPENDING ELECTRODES WITH FLEXIBL CURRENT LEADS

protect the junction of the melting chamber with the hearth. The furnace is covered by an arch, through which the electrode passes. To prevent the interruption of operations when changing electrodes, the latter are attached at the end of rotating arms and when one electrode is removed from the furnace, another can be inserted within two or three minutes.

The cooling of the furnace is effected by a water jacket, similar to that employed on copper smelting furnaces. The furnace is cooled by cast plates in which are embedded

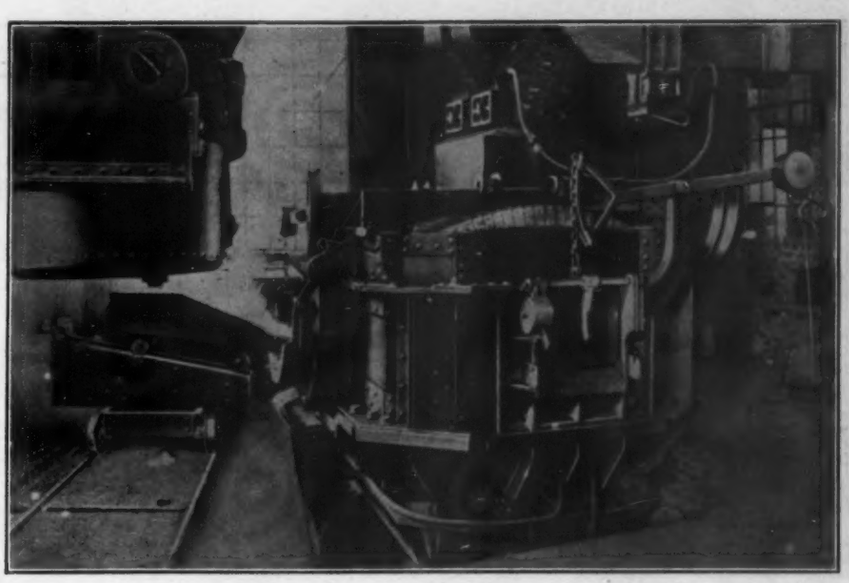


FIG. 7—METHOD OF CHARGING A KELLER FURNACE WITH MOLTEN METAL

the iron tubes through which the cooling water circulates. Furnaces of this type can be operated with three-phase current. Furnaces equipped with a conducting hearth have been installed in six plants in France, Germany and Italy. At Livet, France, the conducting hearth is being used for melting ferro-manganese before it is added to the steel. Figs. 9 and 11 show the Keller type of conducting hearth furnace.

The method used by Keller for connecting the heavy carbon electrodes to their supports is shown in Fig. 6. The head of each carbon electrode contains a cavity in which the expanded bronze end of the flat, flexible current lead is fastened by casting bronze or other suitable metal into the cavity. In this way, a joint is obtained, which is nearly mechanically and electrically perfect. The renewal of the electrodes, when consumed to the head of the carbon, is simplified by use of the revolving arms of the electrode supports.

The H. W. Johns-Manville Co., New York City, recently has established a new southern warehouse at Atlanta, Ga. The building, which is three stories high, has a floor area of 10,000 square feet and the material which will be carried in stock will consist of roofing, boiler and pipe coverings, cements, packings, fire extinguishers, electrical, rail and automobile supplies.

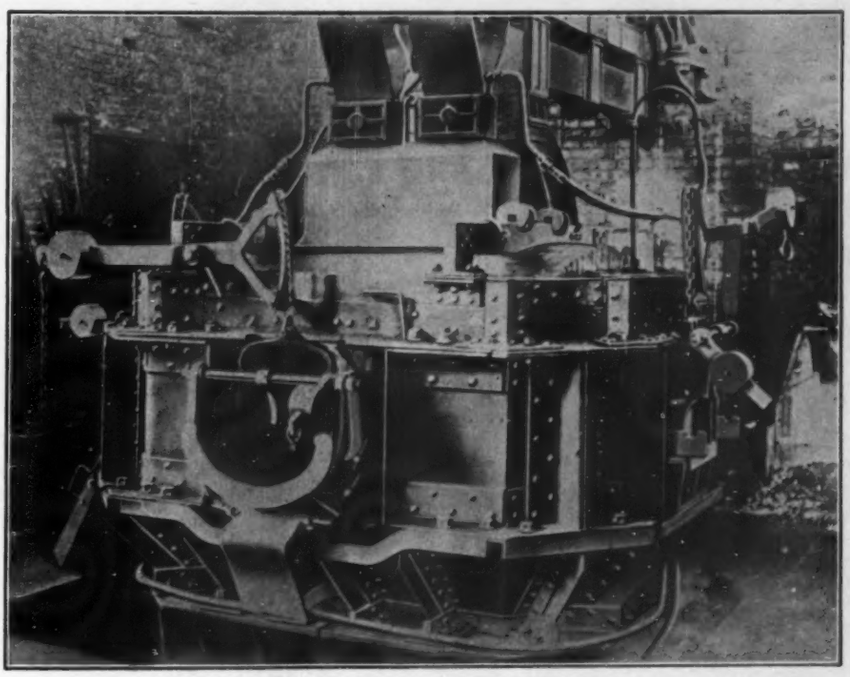


FIG. 8—GENERAL VIEW OF KELLER FURNACE PROVIDED WITH A CONDUCTING HEARTH

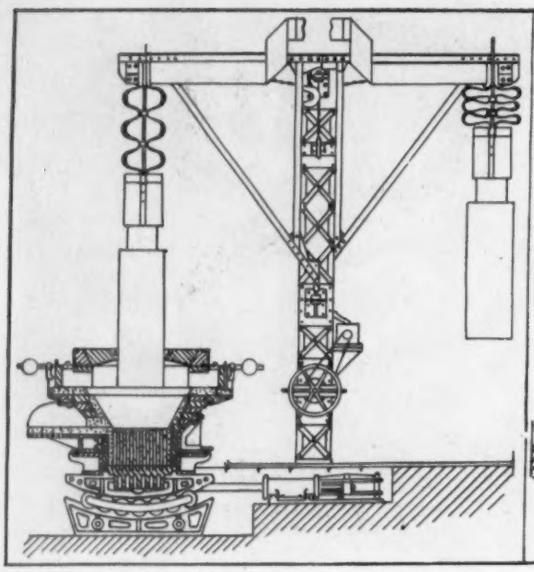


FIG. 9—SECTIONAL ELEVATION OF CONDUCTING HEARTH FURNACE, SHOWING ELECTRODES

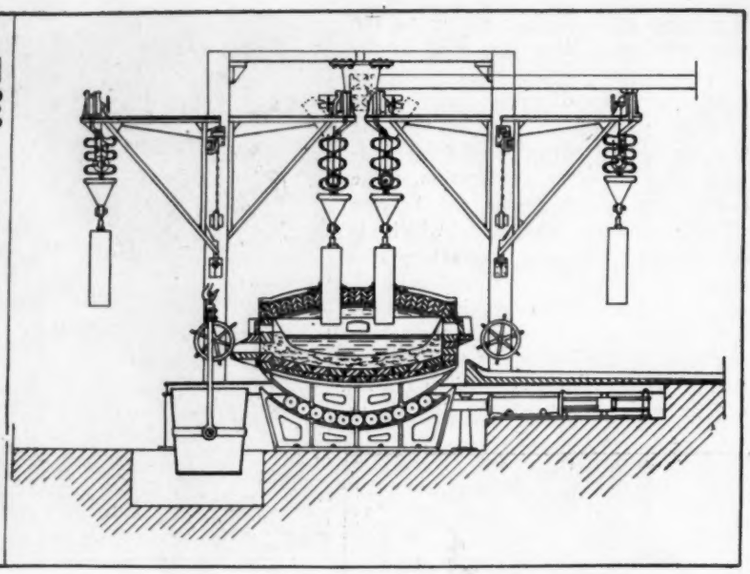


FIG. 10—SECTION OF KELLER, 8,000-KILOGRAM FURNACE AT UNIEUX, FRANCE

Case-Hardening Special Steels

In a paper on the "Case-Hardening of Special Steels," by Albert Sauveur and C. A. Reinhardt, presented at the Cleveland meeting of the American Institute of Mining Engineers, the authors state that although many metallurgists know that some pearlitic special steels can be made troostitic, martensitic and even austenitic without quenching, and therefore without exposing them to the dangers of the quenching bath, the practical significance of such possibility does not seem to have received the attention it deserves. As an illustration, starting with pearlitic steel, by increasing the carbon content or the nickel content, or both, the metal becomes martensitic and eventually austenitic. In this way the properties of hardened carbon steel have been imparted to the metal without quenching it. In other words, the steel is self-hardening. Nickel cannot be introduced into solid steel, but by case-hardening it should be possible to cause pearlitic nickel steel to absorb the necessary amount of carbon to become martensitic, or if desired, austenitic. It should, therefore, be possible to manufacture case-hardened objects of nickel steel and some other special steels having pearlitic, and consequently soft and tough, cores, and troosto-martensitic, martensitic, martinso-austenitic or austenitic cases, without recourse to the quenching bath.

To test the practicability of the manufacture of case-hardened articles of such description, a number of nickel steels of various compositions were subjected to the case-hardening treatment, and no difficulty was experienced in producing martensitic cases, and even in the presence of sufficient nickel, austenitic cases. The nickel steels for the tests were furnished by the Peerless Motor Car Co., Cleveland. The results showed that steel containing about 3.5 per cent of nickel can be made martensitic by case-hardening followed by air-cooling. Slow cooling in the furnace produces a sorbito-cementitic case. In case-hardening nickel steel containing about 5 per cent of nickel, austenitic or martensitic cases

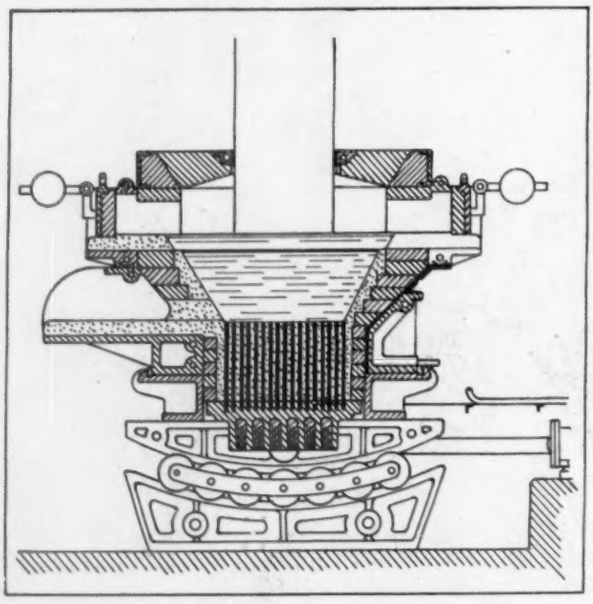


FIG. 11—SECTION OF KELLER FURNACE WITH CONDUCTING HEARTH

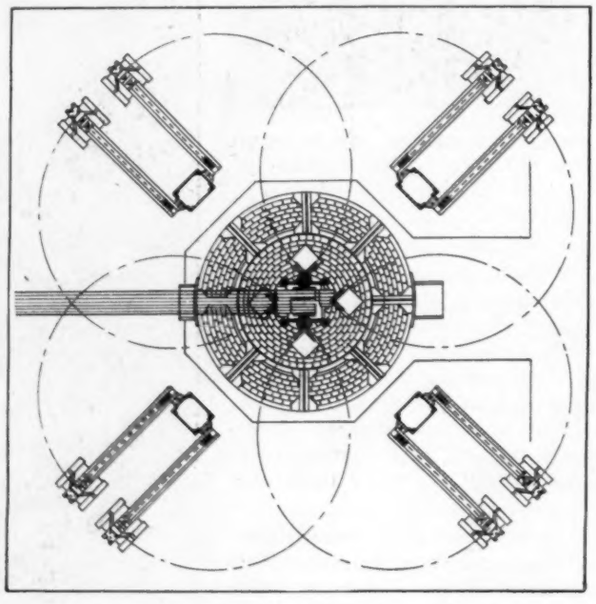


FIG. 12—PLAN OF 8,000-KILOGRAM FURNACE AT UNIEUX

can be produced readily through proper regulation of the length of the operation, and by cooling the case-hardened articles in air.

It is stated that the possible commercial applications of a case-hardening operation, yielding martensitic cases without recourse to the quenching bath, are obvious. It should be possible to case-harden finished machinery, producing hand wearing surfaces.

A New Roll Grinding Machine

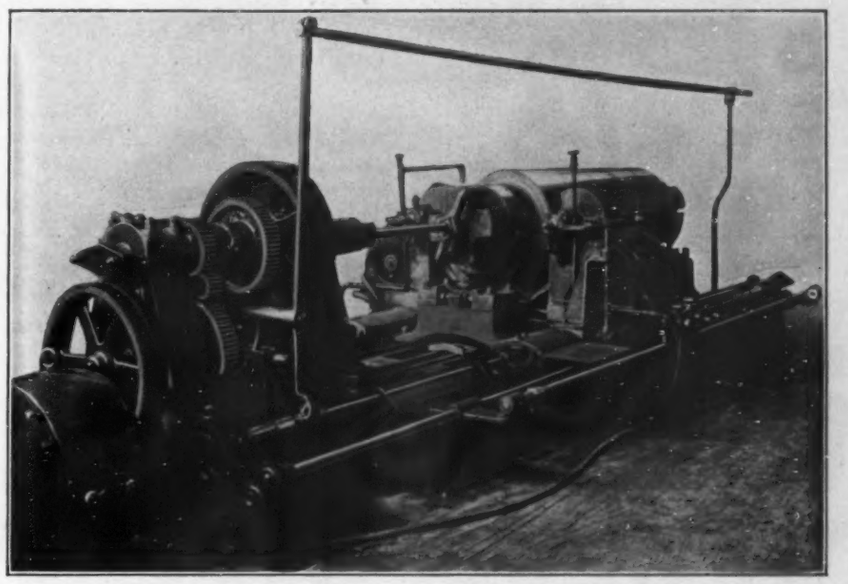
For finishing rolls in sizes up to 32 inches in diameter and 108 inches body length, the A. Garrison Foundry Co., Pittsburgh, recently has designed and built a roll grinding machine for use in its roll finishing department. Before the machine was designed, a number of experiments were made to determine whether a roll could be finished from the rough entirely by grinding. The experiments demonstrated that a grinder, properly designed, could be used to good advantage in dressing and regrinding rolls, particularly those used in plate and sheet mills. The machine has been designed to remove stock much more rapidly than polishing machines of the usual type and is now being built for installation in the roll departments of the rolling mills.

This roll grinding machine, which is shown in the accompanying illustration, is driven by three motors, each acting independently, the one driving the roll and traversing the carriage, while the other two, supported by and traveling with the carriage, are direct-connected to the grinding wheels on either side of the machine. The gears which rotate the roll have double spiral cut teeth while the teeth of the headstock train are cut from the solid. The use of two grinding wheels, one on each side of the roll, makes it possible to grind a cylinder to size within 0.0005 inch without the use of calipers. As the motors are located upon the carriage, overhead belts and shafting are not required, and therefore, the use of a crane for placing rolls upon the machine and lifting them off is not interfered with. The grinding wheel arbors have been designed for easy handling and quick renewal, and the carriage is reversed and the wheels are fed in automatically at the end of each cut. For necking the rolls and for grinding the neck fillets, hand wheel adjustment is provided. Adjustments also can be made for hollow-grinding a roll or tapering it at the ends. Complete electrical equipment is furnished with the machine and includes automatic starters, as well as a pump driven directly from the machine.

Book Review

The Metallography of Iron and Steel, by Albert Sauveur, professor of metallurgy and metallography in Harvard University; 388, 7 x 10½-inch pages; published by Sauveur & Boylston, Cambridge, Mass., and furnished by THE IRON TRADE REVIEW, Cleveland, for $6, postpaid.

The author of this work needs no introduction, as he is among the pioneers in metallographic research. This book reflects a wonderful grasp of the subject, ordinarily abstruse, but which is presented in such a way that it can be readily understood by those lacking in a specialized knowledge of this science. It is intended for the use of those seeking instruction in the metallography of iron and steel and their special needs were carefully considered in the arrangement of the lessons. It should likewise prove of value as a text book.



MACHINE FOR GRINDING SHEET AND TIN PLATE ROLLS

The work is divided into 24 lessons as follows: Apparatus for the metallographic laboratory, pure metals, pure iron, wrought iron, low carbon steel, medium high and high carbon steel, impurities in steel, the thermo critical points of iron and steel, their occurrences, causes and effects, cast iron, mechanical treatment of steel, annealing, hardening and tempering of steel, special steels, their constitutions, properties, treatment and uses of the most important types, malleable cast iron, constituents of metallic alloys, equilibrium diagram of iron-carbon alloys and the phase rule.

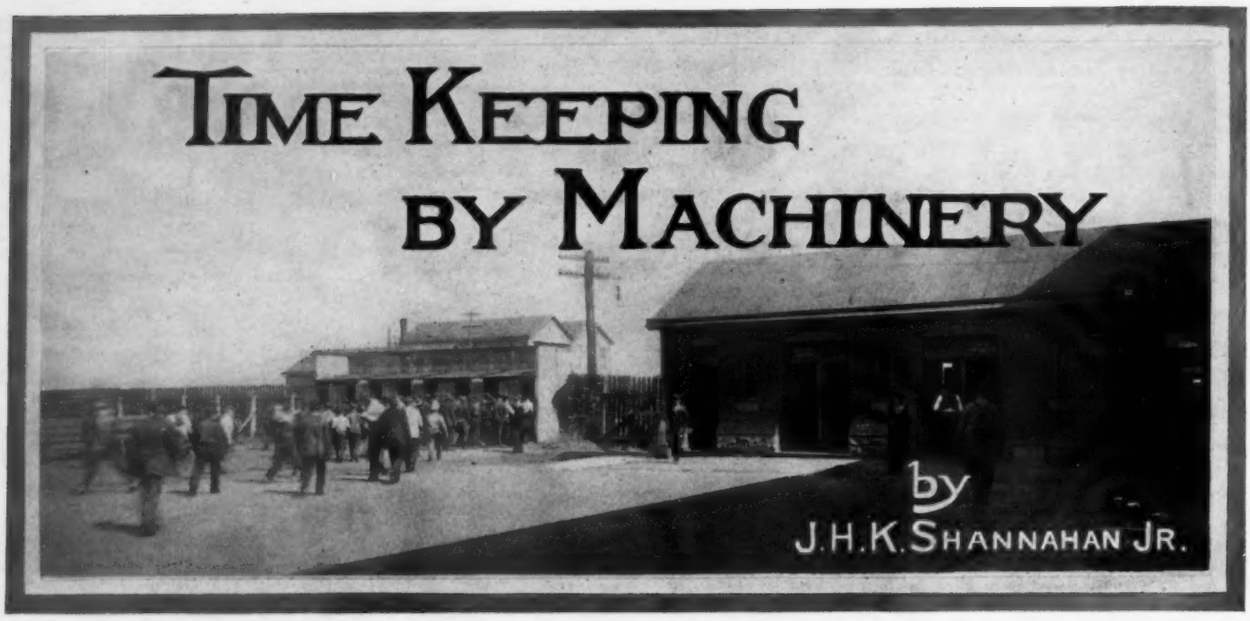
The appendix includes definitions of the microscopic constituents contained in a report of the committee on the Nomenclature and Microscopic Constituents of Steel and Cast Iron presented at the sixth congress of the International Association for Testing Materials.

In addition, the work is profusely illustrated. The author sought to obtain views of the best specimens available and used his own or those taken in his laboratory, only when no better ones, to his knowledge, were published by others. This is a wonderfully well-balanced and exceedingly comprehensive treatise of the subject of iron and steel metallography and should prove of great value to those interested in this science and its application in the iron and steel industries.

Coal, Its Composition, Analysis, Utilization and Valuation; by E. E. Somermeier; 175, 6 x 9-inch pages; illustrated; published by the McGraw-Hill Book Co., New York City, and furnished by THE IRON TRADE REVIEW for $2 net.

Private notes, technical journals, bulletins and text books have been drawn upon for the data and descriptive matter in this book, and, in its manner of presentation, the matter has been arranged for the convenience of the following three classes of readers: The mechanical and power plant engineer; the chemical engineer and chemist; the non-technically trained business man and the operator who has to do with the buying and selling of the coal. The 10 chapters include such subjects as: Composition and heating value, chemical analysis of coal, sampling, methods of analysis, determining calorific value, improvement of coal, etc.

TIME KEEPING BY MACHINERY



by J.H.K. SHANNAHAN JR.

The question of keeping an accurate and trustworthy record of the time made by employes has always been a difficult one to solve satisfactorily. The larger the number of men involved the greater has been the problem. It is not only a case of getting an accurate record of the actual time each man has made as the basis for his pay, but the distribution of his wages to the proper charge account. This has always been a troublesome matter and involving much detail work with a larger array of clerks than the manufacturer cares to see around.

Various methods for keeping time have been tried. The one most common is that of the time-keeper who makes regular trips about the works and from his own observation and from information furnished by the various foremen, obtains the number of hours made by each man. This is unsatisfactory and is frequently inaccurate, besides, there is abundant room for a time-keeper and a foreman, if they are dishonest, to pad the rolls.

All of these problems seem to have been most successfully dealt with by the marine department of the Maryland Steel Co., at Sparrows Point. In this department alone, there are over 2,000 men employed, hence any system which they have developed may be safely assumed to be thoroughly practicable.

A bold step was taken by virtually making each man his own time-keeper. This was made possible by the introduction of a card system operated in conjunction with time clocks. At the entrance to the yard are the clock houses, and the only entrance and exit for the yard is through these houses. To better handle the large number of men there are eight houses, over the doors of each of which is a sign showing the range of numbers whose holders will use that entrance or exit.

On one side of the narrow hallway there is a clock and the card rack. The most obtuse foreign laborer knows his working number, for he thoroughly understands that without it he cannot receive his pay envelope. As his card is always in the same place in the rack and bears his working number in large figures as well as his name, it is but a second's work for him upon going to work in the morning to take his card from the rack, insert it in the clock and place it back properly in the rack.

A word about the card used. This is reproduced in Fig. 1. As will be

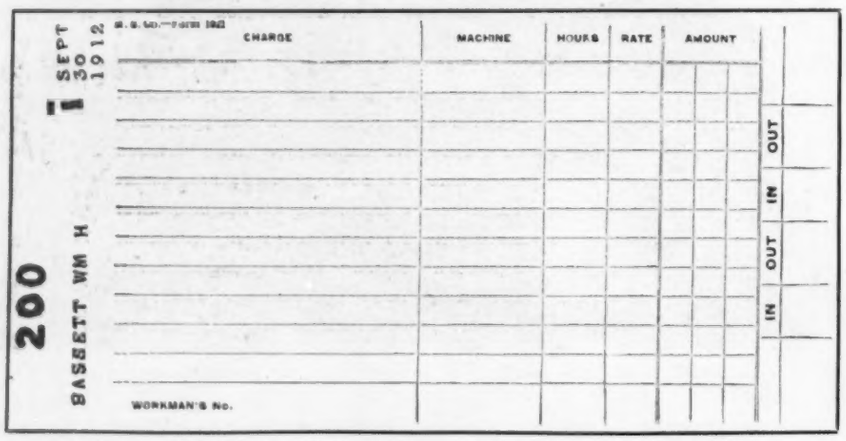


FIG. 1—DAILY CLOCK CARD AND THE BASIS OF ALL OPERATIONS

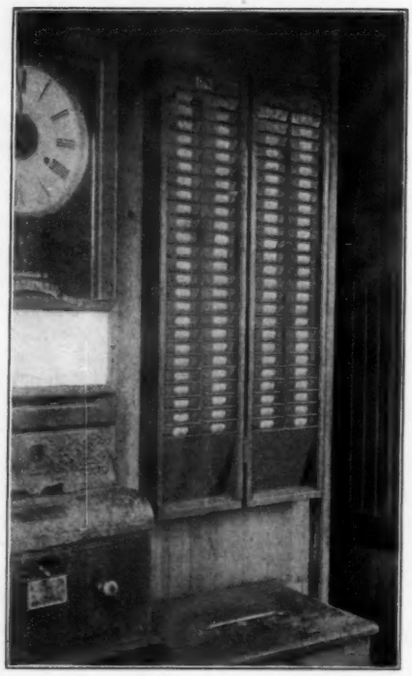


FIG. 2—TIME CLOCK AND CARD RACK

The Maryland Steel Company Pay Roll Week Ending

NAMES OF EMPLOYEES	S	M	T	W	T	F	S	Hours	Wages	Store	Rent	Doctor	B A	Cash	Balance

FIG. 3—TOP OF PAY ROLL SHEET, SHOWING ARRANGEMENT

observed, a new card is used each day. At first weekly cards were tried, a single card being used by a workman for a whole week, but for reasons which are apparent and which will be enlarged upon later on, this was found unsatisfactory and a daily card substituted. After several year's trial, the daily card has been pronounced a complete success.

The clock stamps the time of reporting for work and of quitting, in the spaces marked "In" and "Out." When the workman goes to work in the morning he finds a new card in the rack bearing his name, number and the date. He works it in the clock and places it back in the rack. When he goes out at the noon hour, the operation is repeated, likewise upon his return and upon leaving the yard in the evening, four operations in all.

After the day's work, the card is collected and turned over to the accounting department for entry upon the pay roll and for distribution. *Thus every day's time is distributed the following day.* We will treat of this point, though, a little more in detail later on.

So far as the time made is concerned, employer and workman both feel entirely satisfied that the record shown by the card is absolutely correct.

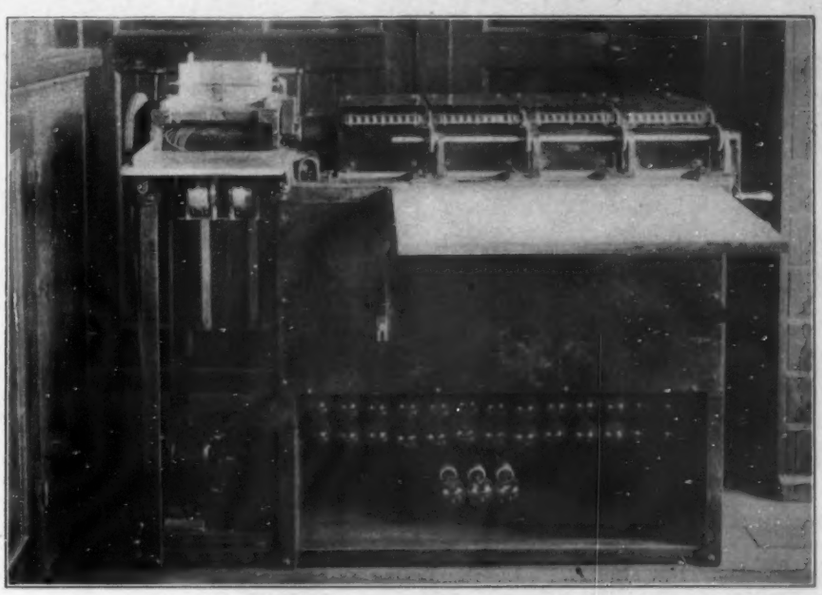


FIG. 5—ELECTRICALLY-DRIVEN ARITHMETICAL MACHINE WHICH ADDS VALUE OF CARDS FED INTO IT

Before taking up the very interesting question of the distribution of the amounts on the cards, it may be well to tell something of the preparation of the pay rolls from data taken from the cards.

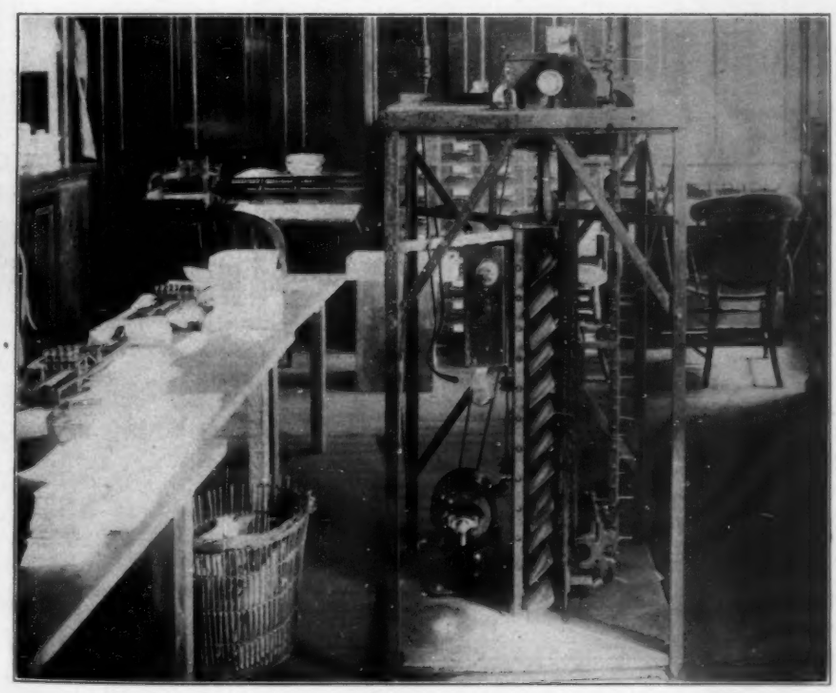


FIG. 4—ELECTRICALLY-DRIVEN CARD SORTER, SHOWING THE BINS IN THE FOREGROUND, INTO WHICH CARDS ARE AUTOMATICALLY PLACED

The paymaster has his pay roll sheets, Fig. 3, on which are *printed* the names of the men and their working numbers. This work is done by an ingenious little machine, run by an electric motor, using an endless chain, each link of which is detachable and bears the name and number of one man. The detachable feature provides for the dropping of a name if a man for any reason is no longer employed. The same chains used for printing the rolls are likewise used to print the names upon the pay envelopes. After the names have been written up on the rolls, the sheets serve for a week and as each day's cards come in, the hours are transcribed to the rolls, as well as the rate. It is therefore, at the end of the week, a very simple problem of arithmetic to arrive at the total earnings for each man. The whole operation, it will be observed, is upon data which the workman has himself kept and furnished.

This disposes of that part of the system having to do with the timekeeping and we may now properly take up its distribution. It is surprising, even in this age, the extent

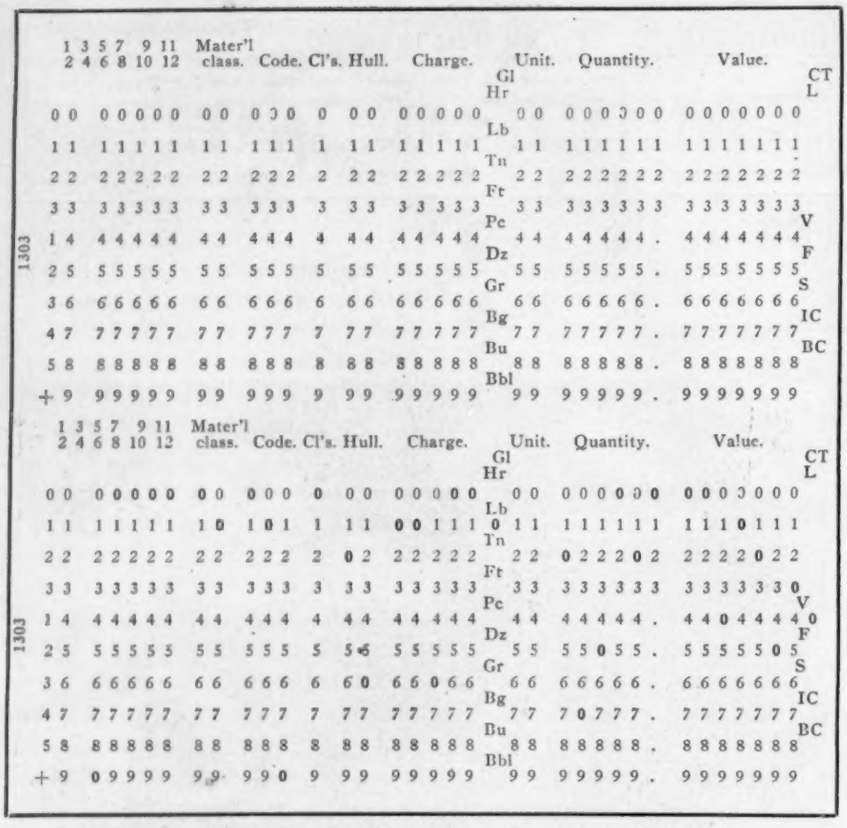


FIG. 6—MATERIAL CARDS BEFORE AND AFTER PUNCHING

to which purely mechanical devices are being introduced into clerical work. Arithmetical machines which will add, multiply, divide and subtract have been on the market for some years and reasonably familiar to all. But here we come to a machine, electrically driven, which will take several hundred or several thousand cards, and separate them automatically into whatever divisions the operator may elect. Standing alongside is another electrically operated machine which will take any given group of cards and by feeding them into it, will add their values with great rapidity and absolute accuracy. It is thus possible to distribute the time of 2,000 men within a few hours, whereas by the old methods it would require a half dozen clerks several days.

But a little more in detail. When the clock card shown in Fig. 1 comes into the accounting repartment, a girl will take the card shown in Fig. 6 and will transcribe the data on No. 1 to No. 6 by punching out the corresponding information. Card No. 6 then forms the basis of operation for the distribution. When all the cards are ready, or any part of them, for that matter, they may be sorted. The sorting machine can be adjusted to sort for any one of the several classes; man's number, operation number, class, hull, charge, machine, etc. The principle of the thing is simplicity itself. As stated before, the machine is electrically operated. The brush which passes over the face of the card comes in contact with the metallic roller back of the card, through the small hole. This forms an electrical contact and operates the slide for that particular bin. Hence all cards punched for the class to which the sorting machine is adjusted, will be thrown together. They may then be passed over to the adding machine and their total values determined.

The same method is employed for the distribution of material used. This card is red in color and is shown in Fig. 7. The data is punched out from information furnished by foremen and the store houses, and the sorting and adding machines perform the same functions for them as for the time cards.

To sum up, the system has unfailing accuracy of the actual time to which each men is entitled, no padded rolls are possible, and with the mechanical devices used, the distribution of the time and material is accomplished with great rapidity and carries with it the assurance that the human agency and its attending tendency to err is reduced to a minimum.

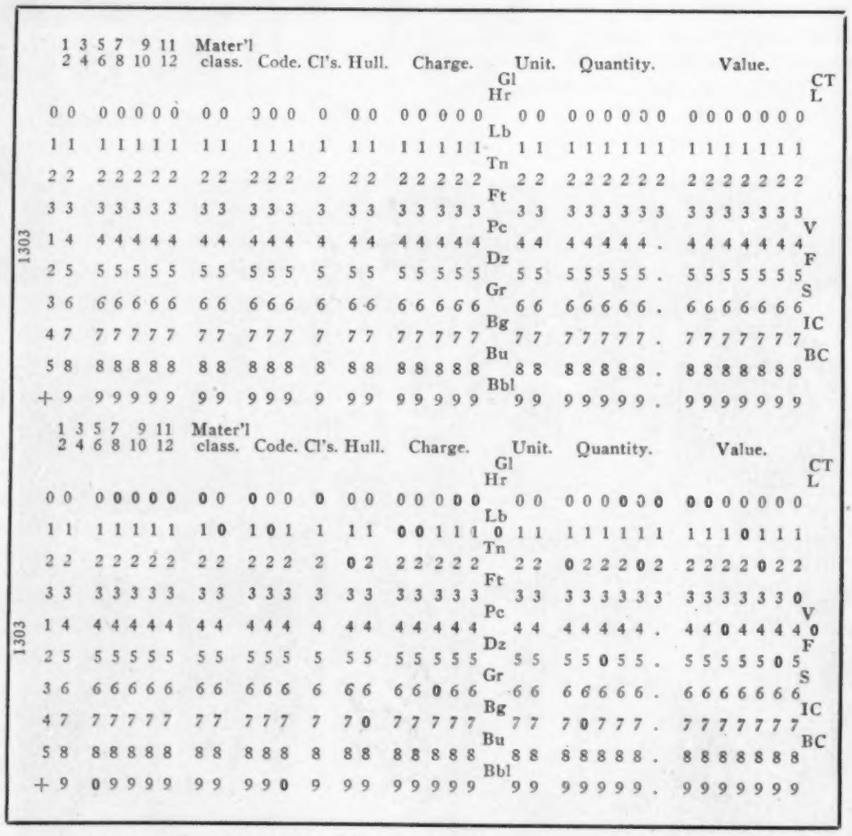


FIG. 7—RED MATERIAL CARDS BEFORE AND AFTER PUNCHING

A New Rotary Shear

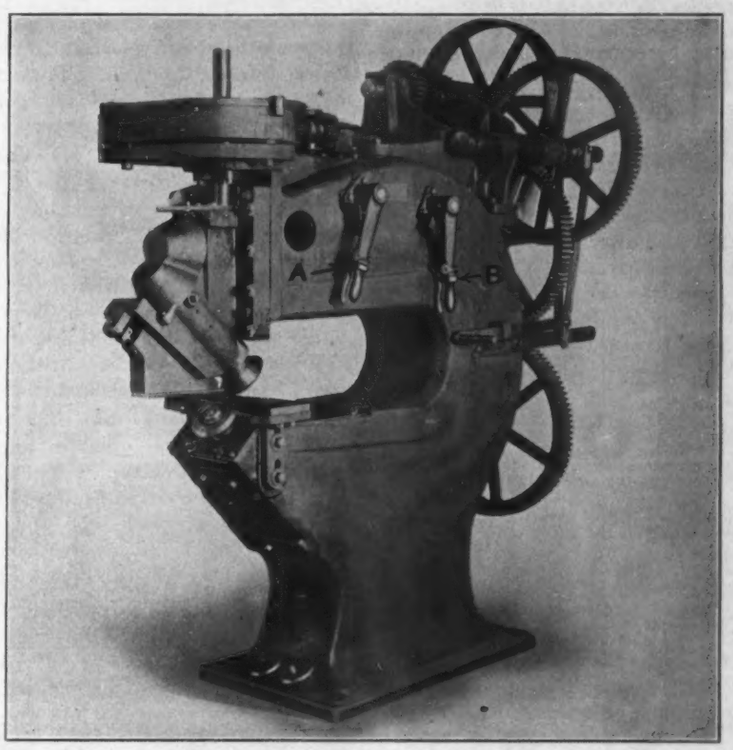
The accompanying illustration shows a rotary shear designed for the irregular cutting of sheet metal, built by H. Collier Smith, Detroit. Rotary shears that cut straight lines or circles and curves in one direction are in general use in sheet metal shops, but this machine is designed to cut irregular lines or reverse curves in light or heavy metal without bending, burring and kinking the sheets. The machine, it is said, will cut the most irregular line or serpentine curve in metal up to 3/8 inch thick, leaving the edges square and the metal flat and smooth. The machine shown will cut plates up to 3/8-inch thick to a reverse curve radius of 4½ inches and greater, and will also cut a 9-inch diameter hole in the center of a sheet without cutting in from the side.

In the average plant that has to do with the cutting of sheet metal from the lightest to the heaviest gages, there is constant necessity for cutting irregular parts, not sufficient in quantity to justify the expense of blanking dies, but requiring laborious and expensive labor with the usual equipment; also the average plant is not equipped with the presses necessary for the use of blanking dies. The usual method of making irregular cuts entails a great loss in material and labor by reason of the necessity for allowing a considerable amount of extra stock in the preliminary roughing-out of the parts. The final cut must be made by cutting, punching or notching approximately along the line and then finishing the edge of the metal by chiseling or filing away the jagged and irregular corners resulting from the previous operations. When using the rotary shear, the parts are scribed from patterns on the sheet as close together as the shape of the pattern will allow, and then instead of roughing out the parts preliminary to cutting the cut is accurately made in one passage through the machine. This applies to openings in the middle portions of a sheet, without cutting in from the side, as well as to cuts which start from the side of the sheet.

In this machine the metal is self-feeding and comparatively little effort is necessary for its guidance in cutting to the line. The cutting of reverse curves is facilitated by the inclination of both cutters with relation to the plane of the metal being cut; thus, both cutters present symmetrically-rounded or conical-shaped adjacent faces to the cut edges of the metal, so that the sheet can be guided to the right or left and a cut can be made in either direction.

The upper cutter with its shaft and beveled driving gears are mounted in a slide which is raised and lowered by a screw, driven by power through the medium of a worm and gear. The raising and lowering of the cutter is controlled by the forward pendant lever, *A*, so that in cutting an opening in heavy metal it is only necessary to move the lever forward to raise the cutter, allowing the insertion of the metal, and then move it the other way for lowering the cutter through the metal. The horizontal handle at the rear controls the main drive clutch by means of which the machine is started and stopped as desired.

These machines are provided with variable speed drive of the gear type, affording three speeds. The variable speed mechanism consist of three pairs of gears that are always in mesh, and a sliding key in the lower shaft that is shifted from one pair of gears to another by moving the lever *B*. The machine is provided with an automatic stop mechanism for controlling the vertical travel of the slide carrying the upper cutter. This stop mechanism can be quickly adjusted to control the worm gear drive clutch, so that the exact point to which the upper cutter must be lowered with relation to the lower cutter in order to produce the best cutting results, is governed automatically. A safety knock-out also is provided to prevent raising the slide high enough to jam in its topmost position. A vertically adjustable supporting table of hardened steel is provided. It extends across the machine behind and partly around the lower cutter, and a vertically adjustable tool steel stripper is provided in front of and partly around the upper cutter. Thus the metal is guided in a horizontal direction and the tendency of the cut metal to follow around the rear edge of the cutters is counteracted.



ROTARY SHEAR FOR THE IRREGULAR CUTTING OF SHEET METAL

Vanadium Steel Pinions

In the November issue of *American Vanadium Facts*, published by the American Vanadium Co., Pittsburgh, it is stated that the records of La Belle Iron Works, Steubenville, O., show that a 45-inch vanadium steel blooming mill pinion gave 78 per cent longer service than the best record made by any 3½ per cent nickel steel pinion used in the same mill. The vanadium pinion rolled 265,230 tons before replacement, while the highest record with the 3½ per cent nickel pinion was only 149,035 tons. Another set of vanadium steel pinions now operating in the same plant has 156,108 tons to its credit.

The dividend of the Friedrich Krupp Co., for the last financial year, was at the rate of 12 per cent.

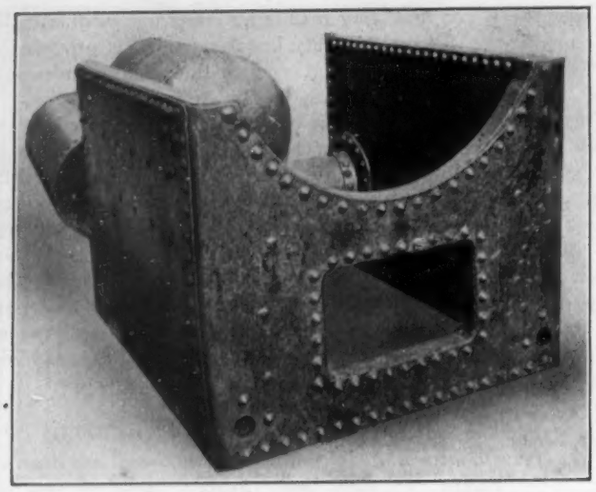


FIG. 1—RIVETED FIREBOX FOR STEAM BOILER

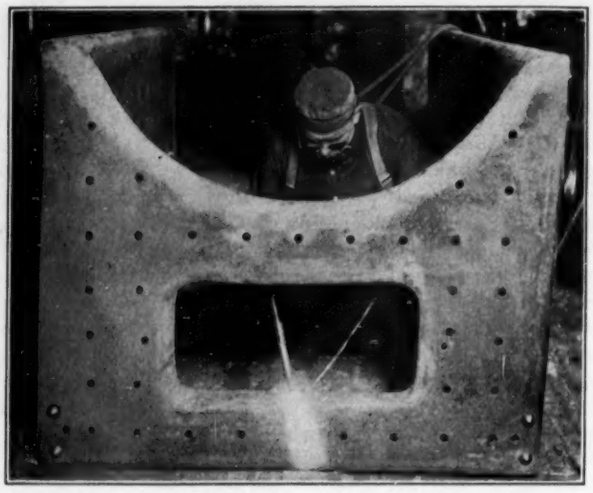


FIG. 2—WELDED FIREBOX FOR STEAM BOILER

Welding Fireboxes by the Acetylene Process

A well-known boiler works in Chicago has been successful in applying the oxy-acetylene welding process to the manufacture of water legs for heating and power boilers in the place of the usual riveted fastenings. The contrast between the two forms of construction is illustrated in Figs. 1 and 2, the former showing a riveted and the latter a welded firebox.

The construction of the welded firebox, it will be noted, eliminates entirely the use of the 4-inch cast iron mud ring, which is not only difficult to cast but is difficult to drill and set in place. By the new method, the two half-sheets are bent to form the three sides of the firebox and the edges are dished over, extending 1½ inches each. A ¼-inch bevel is made on each edge, the two halves are assembled 1⅛ inches apart and then welded along the seam.

This method of construction, which was used on the first welded firebox, will probably be changed so that each of the three sides will be welded separately and then welded on the four vertical edges which touch each other, as shown in Fig. 3. The welding is said to produce an absolutely tight joint which requires no calking.

The cost of manufacturing the firebox illustrated, which weighs 500 pounds and on which there are 44 feet, 8 inches of weld, is between $16.80 and $18. This cost will doubtless be reduced somewhat as improved methods of handling the firebox are devised. The manufacturer states that even the present cost of welding is cheaper than previous methods of riveting.

One of the obvious advantages of welding is that one operator does all the work necessary, while with the former process of riveting and flanging, at least three men, and part of the time four, were required.

The illustrations show the operator welding various parts of the firebox and the method of handling with block and tackle. Twenty-four hours actual welding time were consumed in the construction of this firebox, while several hours in addition were required for handling and preparation. This extra time will be largely eliminated in subsequent manufacture.

The welded firebox has been tested at 210 pounds water pressure, and has met every requirement of quick construction. The riveted firebox, Fig. 1, is of the low pressure type, and there are employed in its construction 105 staybolts. The welded firebox which is of the high pressure type, has 210 staybolts, the same number as a riveted box of same size and type. The welding operations are executed with apparatus furnished by the Oxweld Acetylene Co., Chicago.

FIG. 3 — WELDING VERTICAL SEAMS

Power Press With Automatic Brake

A new power press which is provided with an automatic brake specially designed to eliminate loss of efficiency through friction, is now being built by the Rockford Iron Works, Rockford, Ill. A general view of the press is shown in Fig. 1 and a detail of the brake mechanism is illustrated in Fig. 2.

The action of the brake is controlled automatically by the treadle. When the latter is depressed, the clutch release pawl, *5*, Fig. 2, is drawn down, releasing the clutch pin, *4*, which is forced forward by a compression spring into one of the three hardened tool steel contact points on the fly-wheel. Just before the clutch pin is released, by the same pressure on the treadle the toggle joint, *6* which holds the brake, *1*, against the hardened tool steel projection, *2*, on the driver, *3*, is broken. This releases the brake and holds it off the driver until the foot is removed from the treadle. Setting the brake by taking the foot off the treadle reverses the foregoing operations. At no time during the operation of the machine is there any friction except at the exact point intended, the top of the stroke. The brake is placed on the right hand side of the press, eliminating torsional strains on the shaft. This arrangement also gives plenty of room on the left side so the automatic feed, oiling device, etc., can be easily attached.

The frame of the machine is of straight line design with extra metal placed at the points where the greatest stresses come. The casting is made without a core, giving uniformity in thickness and shape of metal.

The frame can be adjusted readily from an upright to an inclined position by loosening the four clamp bolts in the legs. The shaft and driver are made of hammered steel, forged in one solid piece. The main bearings are extra wide and are bored out at right angles to the center of the slide by a special fixture which insures accurate alignment. All bearings are adjustable and are provided with oil cups.

The slide is of sufficient length to insure permanent alignment and can be adjusted at one side only, making it impossible to throw it out of true. The connection and screw are made of tool steel, designed for quick adjustment and stiffness. The clutch is of the sliding pin type, arranged so it may be easily taken apart for examination and cleaning. When the treadle

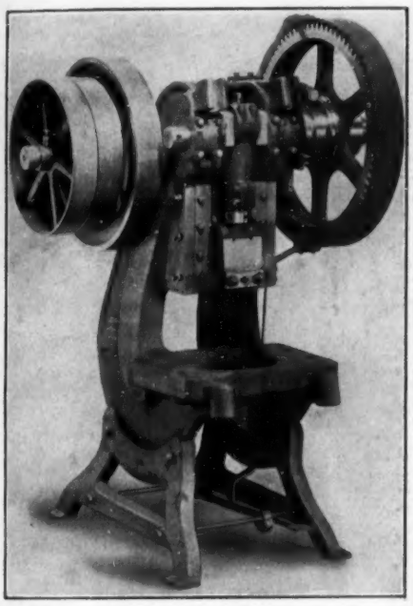


FIG. 1—ROCKFORD POWER PRESS

is depressed, the clutch pin is forced into contact with one of the three engaging points on the fly-wheel, causing the press to act at once. A device is provided for locking the pin while it is withdrawn, so adjustments can be safely made or dies set without removing the belt from the flywheel. An automatic safety stop prevents repeating.

The flywheel is extra heavy, specially balanced and has a long bronze bushed bearing with provision for oiling while running. The knock-out is hinged to the press and enters the slide at the back above the punch socket. It is said to be positive in action and may be adjusted by a set screw and nut. Arrangement is made for locking the treadle down for continuous operations.

Action of Carbonizing Materials

The practice of carbonizing steel for case-hardening has assumed great commercial importance within the last 10 years, according to Robert R. Abbott, of Cleveland. In a paper on the "Action of Various Commercial Carbonizing Materials", presented at the Cleveland meeting of the American Institute of Mining Engineers, the author states that formerly, case-hardened steel was held in more or less contempt, since it was considered a cheap substitute for tool steel. This is no longer the case. The development of the motor car industry, and coincidentally that of modern alloy steels, has resulted in overcoming many difficulties formerly experienced in case-hardening. This result has been accomplished by increased knowledge regarding the analysis of the steel which would respond most readily to case-hardening, and by more careful methods of treatment of the carbonized steel.

The ordinary method of carbonizing consists in packing the steel with the carbonizing material in cast iron boxes and placing them in a furnace at a temperature of from 1,500 to 1,900 degrees Fahr., for a time sufficient to give the required depth of case. The steel is then either quenched directly from the box, or is allowed to cool without unpacking, and finally is given a single hardening heat, or for special work, two or three heats.

Consumption of Carbonizing Materials

During 1911, more than 100,000 tons of carbonizing material were sold in the United States, at an average price of probably $55 per ton. More than 85 per cent of this material consisted of granulated bone. Within the last four years many manufactured compounds have been placed on the market, consisting largely of some form of carbon or carbonaceous material, with or without the addition of chemicals. Steel will absorb carbon placed in contact with it at the temperature of the atmosphere. The reaction is exceedingly slow, but increases rapidly with increasing temperature. Below 1,500 degrees Fahr., the absorption is too slow to be commercially important. Various causes combine to make it impracticable to carbonize above 1,900 degrees Fahr. In general, carbonizing is carried out at temperatures ranging from 1,550 to 1,750 degrees, and higher temperatures are used only when the quality is not as important as the cost. Broadly speaking, the higher temperatures can be employed for high grade work when proper facilities are at hand for a careful regulation of the temperature, and a knowledge is possessed of the correct subsequent heat-treatment of the carbonized product.

When steel is carbonized, the carbon does not penetrate in a gradually decreasing content from a high carbon exterior to the uncarbonized core, but rather in a series of steps. Many of the commercial materials behave differently in carbonizing, and even under exactly the same conditions of time and temperature, different depths of penetration or different per cents of carbon, or both, are obtained. In order to produce good results in case-hardening, a uniform material must be used, and the treatment of steel subsequent to carbonizing must be suited to the nature of the case produced.

The investigation was undertaken to compare most of the important commercial carbonizers as to cost of carbonizing, rapidity of carboniz-

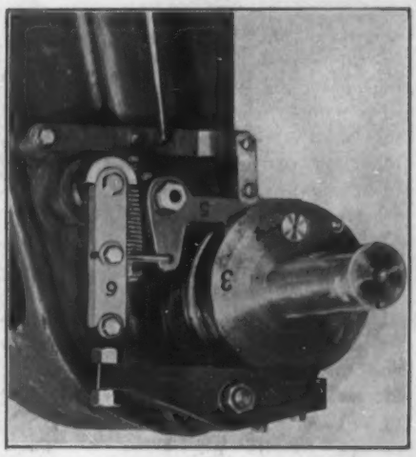


FIG. 2—DETAILS OF BRAKE MECHANISM

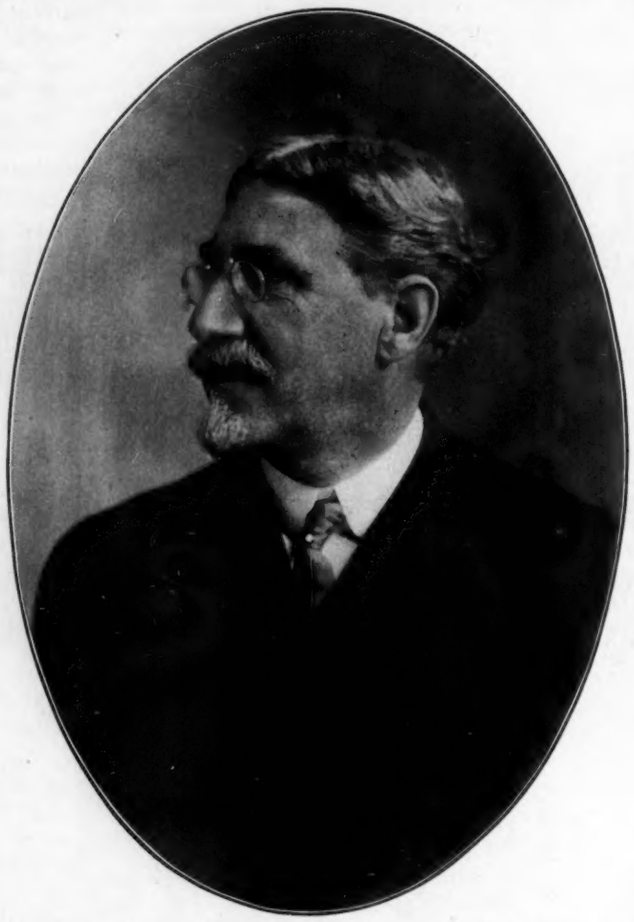
ing and the nature of the resultant carbon zones. In discussing the results, Mr. Abbott states that "the use to which case-hardened steel is to be put should be the deciding factor in selecting the material with which it is to be carbonized, and also to a less extent the temperature of carbonization should be determined from similar considerations." The question of carbonizing material is one which usually is not given the attention which its importance demands. A few sample tests conducted under intelligent direction will often result not only in a great saving of money, but in increased efficiency with regard to the product.

On Nov. 1, 1912, 49 furnaces were in blast in Belgium, compared with 43 on Nov. 1, 1911. The aggregate output for the 10 months ended Oct. 31, this year, was 1,932,380 tons.

Growing Application for Scientific Management

Discussed by the Members of the American Society of Mechanical Engineers at Their New York Meeting—Gas Power Development

"Scientific Management" was pre-eminent among the many practical topics discussed at the thirty-third annual meeting of the American Society of Mechanical Engineers, held at the Engineering Societies' building, New York City, Dec. 3 to 6. So great was the interest manifested in this subject that two sessions were devoted to its consideration, in place of one originally assigned. By far the most interesting development reported in making time studies is the introduction of the moving picture machine, which clearly shows the movements of the workmen and permits of timing them accurately in fractions of a second. At the plant of the New England Butt Co., Providence, R. I., where this innovation was made, practically 1,000 feet of film were obtained to facilitate studies of the time consumed in the performance of the various manufacturing operations. The efficiency of scientific management in this plant is reflected by the reduction of time from 38 to less than seven minutes required in the assembling of a braiding machine. It was stated, also, that the introduction of this method of shop management has been retarded by misleading and distorted statements of increased labor accompanied by reduced remuneration, although records will prove that wherever scientific management has been adopted and the workmen are paid on the piecework or the bonus plan, their wages invariably are increased from 30 to 100 per cent.



DR. W. F. M. GOSS, PRESIDENT-ELECT, AMERICAN SOCIETY OF MECHANICAL ENGINEERS

To complete the extensive program in the time allotted, simultaneous sessions of the various sections were held. The grouping of the papers and discussion under several general subjects, greatly facilitated proceedings and permitted the engineers to attend the meetings in which they were most interested. The reception and subscription dinner tendered to Prof. John E. Sweet, of Syracuse, N. Y., on Wednesday evening, in celebration of his eightieth birthday, and in recognition of his services to the engineering profession, and the award on Thursday evening of the John Fritz medal for 1912, which was conferred upon Robert W. Hunt, of Chicago, for his contribution to the early development of the Bessemer processes, were two delightful and memorable events, which featured this annual meeting.

The activities of the American Society of Mechanical Engineers for the year 1911 to 1912 have covered a wide scope. Prominent among these has been co-operation with other societies. For this purpose, a conference committee has been formed, consisting of two appointees each from the American Society of Civil Engineers, the American Institute of Electrical Engineers and the American Society of Mechanical Engineers, whose province it is to bring to the attention of their respective organizations for action, questions of importance. A committee of engineering standards has been formed, with which the prominent engineering societies of the country have been asked to co-operate to establish a clearing house for the issuance of information respecting standards for the engineering profession.

The membership of the society showed a net increase of 335 from a total of 4,007 in 1911 to 4,342 on Oct. 1, this year. A total of 865 applications for membership was received during the year, of which 694 were recommended for enrollment. The finance committee reported that the total income for the year ending Sept. 30, 1912, was $112,535.06, an increase of $17,453.32 over the previous year. The total expenditures of the society were $101,306.25, an increase of $6,915.42. The total assets of the society aggregate $650,820.85.

"The Present Opportunities and Consequent Responsibilities of the Engineer" was the subject of the presidential address delivered by Dr. Alexander C. Humphreys, president of the Stevens Institute of Technology, Hoboken, N. J. On the subject of the study of engineering science, he spoke as follows:

"Of late years we hear much to the effect that by reason of the rapid strides made and being made in engineering science, the courses in our colleges of engineering should be extended from four years to five, six and even seven years. Will five, six, seven, ten or even twenty years be sufficient? My answer is in the negative. In four years the college of engineering should be able to teach its students how to learn by themselves and so to profit effectively by the teachings of experience."

At the conclusion of Dr. Humphreys' address, the election of Dr. W. F. M. Goss, dean of the college of engineering, University of Illinois, as president of the society, was announced. Following his introduction, a reception was held in the society's rooms. Other officers elected follow:

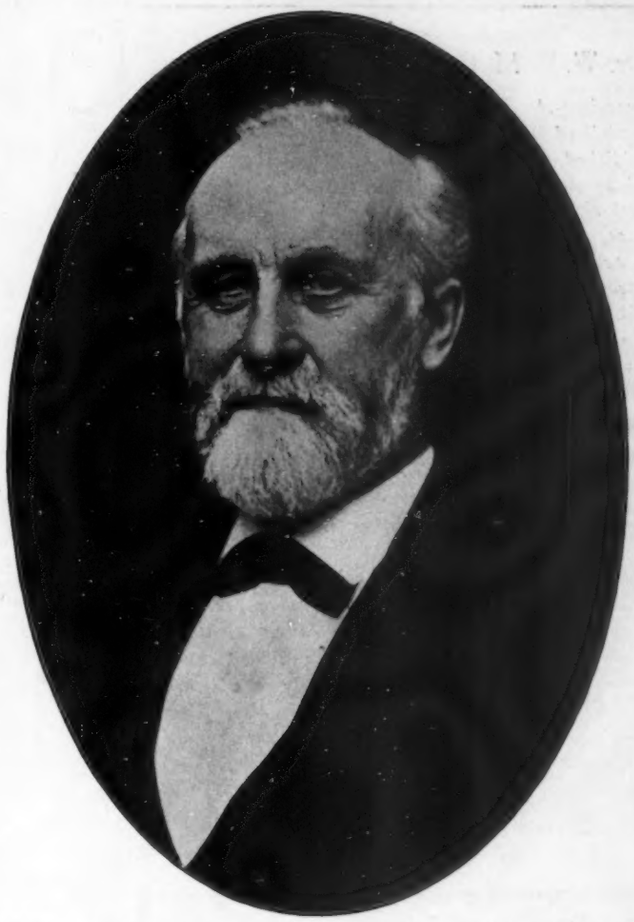
Vice presidents: Jas. Hartness, president Jones & Lamson

Machine Co., Springfield, Mass.; I. E. Moultroup, mechanical engineer, Edison Electric Illuminating Co., Boston, and H. G. Stott, superintendent of motive power, Interborough Rapid Transit Co., New York.

Managers: W. B. Jackson, D. C. & Wm. B. Jackson, Chicago; Henry M. Leland, general manager Cadillac Motor Car Co., Detroit, and Alfred Nobel, New York City.

Treasurer, Wm. H. Wiley, New York.

At the meeting of the Gas Power Section, Chairman H. J. Freyn, of the Allis-Chalmers Co., Milwaukee, delivered an exceedingly interesting address upon the recent development of gas power in Europe. His investigation covered a large part of the field of application of gas power and the development of the internal combustion engine in Europe, which, he said, has been very marked during the last year and great strides in advance were made, especially by the Diesel engine. He added that he was unable to find anywhere the 10,000 and 15,000-horsepower Diesel engine ships which were reported by enthusiasts of the Diesel engine as having been built recently. The largest single Diesel engine unit propelling any ship afloat develops not over 2,000 horsepower. To what importance the use of tar oil has grown on the European continent, can be judged from the fact that France has to rely almost exclusively on the use of this fuel on account of the very high import duties on natural oils. It is estimated that the total world production of coal tar oil is approximately 1,000,000 tons per annum, and since the recognition that coal is too valuable a fuel to be wasted, the number of by-product coke ovens and by-product gas producer plants is steadily increasing, especially in this country, and as a result, the total production of tar oil will greatly increase. This paper will appear later in THE IRON TRADE REVIEW.



PROF. JOHN E. SWEET, PAST PRESIDENT, WHO WAS TENDERED A DINNER BY THE SOCIETY

"The Use of Heavy Oils in Internal Combustion Engines" was the subject of a paper presented by Irving C. Allen, affiliated with the experiment station operated by the United States bureau of mines, at Pittsburgh. At present the bureau of mines is engaged in a search for ways and means of utilizing the waste products which may be used for the production of power and other useful purposes. The amount of such products is very large. Thus, of gas oil (the portion of the oil whose specific gravity lies between those of the heavy naphthas or kerosenes and the light spindle oils) over 8,600,000 barrels could have been produced from the oil produced in the United States in 1911; in 1909, there were actually produced in this country 60,000,000 gallons of coal tar and over 90,000,000 gallons of gas tars; nearly 400,000 gallons of wood oils and over 1,300,000 gallons of tars and, in addition, there is a practically unlimited source of supply of wood alcohols, both those produced by destructive distillation of waste woods and by fermentation from various carbonaceous materials, such as cornstalks, vegetable and fruit wastes, etc. As approximately 0.4 pound of oil similar to gas oil will produce one horsepower when burned in a heavy oil engine, the production of gas oil from the petroleum fields in 1911 would alone develop over six and one-third billion horsepower-hours, without in any way interfering with the uses of the other petroleum products now manufactured.

This is particularly important in view of the growing certainty that liquid fuel may be conveniently and safely used for the propulsion of warships, the total relative power of a heavy oil internal combustion engine for marine propulsion compared to a coal steam engine for the same purpose (considering fuel storage, calorific value and engine efficiency) being approximately 38.5 to 10 in favor of the oil engine.

The investigations made by Mr. Allen led him to conclude that the future of the heavy oil engine is assured. He added that better and more extensive uses for coal by-product liquid fuels are being developed, and, what is of great importance to the petroleum industry of the United States, there is being developed a better use for the heavy asphaltum liquid fuels and the cheap gas oils produced in such large quantities in this country.

Scientific Management

The great interest manifested in scientific management was reflected by the large attendance at the two sessions devoted exclusively to the discussion of this subject. J. M. Dodge, of the Link-Belt Co., Philadelphia, presided, and both majority and minority reports of the sub-committee on administration were presented. J. M. Dodge is chairman of this committee and L. P. Alford, secretary. The majority report was exhaustive and traced the art of industrial management from its beginning. It was stated that inasmuch as labor-saving management springs from a change in mental attitude, the beginning of its practice should be with the persons having the final responsibility. Before any changes are made, such men should clearly understand the viewpoint from which all of the managerial work is to be done. On the other hand, a similar mental attitude must be fostered among all the members of the executive force and a period of training for them must be begun. The majority report further stated that the usual conception of modern management is that it affects the workmen most of all, tending to stimulate them to turn out increased production to their possible advantage. This conception, however, was claimed to be wrong. If the principles outlined are followed, the executive or non-producing labor is the most affected. Its individuals are compelled to study, plan and direct, and they must acquire knowledge and skill in order to transfer it.

The causes of most so-called failures were assigned to the failure of executives to acquire the vital men-

tal attitude and to too great haste in application. The committee emphasized the danger of attempting to hurry any change in methods of management. Each step of the work should be made permanent before the next is begun. The majority report further stated that one of the unfortunate features of this great movement has been the rise of alleged experts who have been ready to promise extravagant results if they were allowed to systematize an industrial plant. However, the test which their work cannot meet is the one of permanence. In summarizing the broad results of labor-saving management, the following conclusions were reached:

In cases where the use of labor-saving management can be considered a success, the broad results have been: A reduced cost of product; greater promptness in delivery with the ability to set and meet dates of shipment; a greater output per worker per day with increased wages; and an improvement in the contentment of the workers. This last item is shown by the fewness of strikes under the new management, and in the refusal of those working under the changed conditions to join in a strike of their fellows in the same plant, who were not working under the new methods. This last-mentioned situation has arisen a number of times. In one case an attempt was made to strike a room where about one-half of the operators were under the new conditions. These refused to go out; the rest went.

These results indicate certain advantages to both employer and employe. But it is charged that the movement has not yet entirely justified itself from the economic viewpoint, for it has not reduced the cost of product to the consumer. The implication is that its possibilities will not be realized until employers, employes and the public are alike benefited. With this view we are in most hearty accord. Labor-saving machinery has brought the comforts that we all enjoy today. Labor saving management promises to extend those comforts. Where properly administered it is conserving labor and is thus contributing to the good of society at large, and, although the benefit to the consumer may not yet be generally felt, it has already developed to a certain extent and will continue to develop as the natural result of increased production.

Dr. W. F. M. Goss

Dr. W. F. M. Goss, president-elect of the American Society of Mechanical Engineers, has specialized largely in steam engineering and at Purdue University he established, in 1891, the first locomotive testing plant in the world. This laboratory is equipped with apparatus for testing locomotives of the largest size and the research work conducted under the supervision of Dr. Goss, particularly with reference to locomotive efficiency, has, to a large extent, led to the establishment of standard practice in locomotive engineering.

Dr. Goss was born Oct. 7, 1859, at Barnstable, Mass., and received a certificate of graduation in 1879, from the department of mechanics arts of the Massachusetts Institute of Technology. In the same year, he was appointed instructor in practical mechanics at Purdue University, Lafayette, Ind., serving in various capacities for a period of 28 years, during the latter portion of which he was dean of the engineering school. In 1907, he was appointed dean of the College of Engineering of the University of Illinois, Urbana, Ill., which position he now holds. In 1903, he received the degree of Doctor of Engineering from the University of Illinois.

In addition to his duties as dean of the Engineering School of the University of Illinois, Dr. Goss is director of the engineering experiment station conducted by this institution. The locomotive testing plant at Purdue, which for many years was the only one of its kind, proved so successful that the Pennsylvania Railroad Co. recently established a similar plant at Altoona, Pa., and the Columbia University, New York City, is now equipped to make similar tests. Dr. Goss is a member of the Master Car Builders' Association, Railway Master Mechanics, Society for the Promotion of Engineering Education, Western Society of Engineers, of Chicago, and is a Fellow of the American Association for the Advancement of Science.

Minority Report

H. H. Vaughan, assistant to the president of the Canadian Pacific railroad, signed the minority report. He stated that the introduction of the use of scientific methods has been attended by claims as to the results that might be obtained by their use and these claims have led to such absurd statements as that made before the Interstate Commerce Commission with reference to a saving of $1,000,000 per day that could be made by the railroads if efficiently managed. He added that he does not feel that any one of the improved methods of management is a panacea for all inefficiency. In certain classes of work, time studies are valuable, but in others they may be a waste of time. In conclusion, he stated that labor-saving management is not any particular system, but will always remain the art of selecting and applying the most appropriate methods furnished by the science of management, the science that records what these methods are and the results obtained from them.

Edward B. Passano, Baltimore, presented a paper entitled "Measuring Efficiency in Manufacturing on a Basis of Profit". He said that one of the fundamental principles accepted by all accountants is that all items of expense should be charged direct to the department or production factor, whenever it is possible to do so. He urged against the distribution of expense items on a percentage or similar basis and in the same manner all inefficiency can be chargeable to some one. Under the military form of shop management, if it is known positively that a workman's production is without profit to the organization, he is discharged. Under the modern form of scientific shop management, the plan is to study the working conditions and by standardizing the equipment and method of operation, and by training the workman, raise his efficiency.. It benefits not only on him and his employer but the community in which he lives.

Manufacturing Costs

"Axioms Concerning Manufacturing Costs" were presented in a paper prepared by Henry R. Towne, New York City. A total of 23 axioms was presented and it was stated that the aim and object of every accounting and cost system should be to afford true and accurate information as to facts. These should be presented without bias in any direction. It was stated further that the creation of a correct science of an industrial accounting and costs should be the desire and aim of all who are concerned with industrial management, and to accomplish this, the following three conditions are required:

Clear understanding of fundamental principles.

Definite terminology generally understood and accepted.

Free interchange of the data of

practice, whereby the adoption of sound principles may be promoted, the experience of each may be available to all, the best methods may be established, and, above all, a standard system may be ultimately created.

Chairman Dodge, in opening the discussion, announced that 40 members had signified their intention to discuss the papers and the committee reports. Charles B. Going, New York City, took exception to the report for the reason that it was not sufficient in scope and did not describe all the phases of the subject of scientific management. Prof. C. B. Thompson, of Harvard University, doubted the ability of engineers to establish wages either by bonus, premium or other systems. Dr. Alex. C. Humphries, retiring president of the society, took exception to this statement and voiced the opinion that the book economist makes his principal error in failing to look on all sides of a question. Failing in this regard, he is unable to arrive at a sane conclusion. "I do not hesitate to state," he added, "that some of the most inefficient guides as to questions of economics are certain of the guides and professors of economics in our universities."

The Democratic and Autocratic Spirit

H. M. Wilcox did not favor the use of the term *labor-saving management* in the majority report, and suggested the term *scientific management* instead. He also directed attention to the obvious failure of industrial establishments to employ a purchasing agent for labor whose duties would be similar to those of a purchasing agent for materials. By the employment of a purchasing agent for labor, who specialized in this line of work, it was suggested that the best class of labor could be obtained that the market affords. Prof. H. L. Gantt, of Harvard University, delivered an exceedingly interesting illustrated talk on the results obtained by the introduction of scientific management in machine shops and other industrial plants. He directed attention to the economic change in manufacturing pursuits and characterized it as *the growth of democratic as opposed to autocratic spirit in industry.* He said that increasing the efficiency of workmen differs materially from increasing the efficiency of a machine, inasmuch as the latter does not share in the increased profit derived from its greater efficiency. Charts were displayed which showed graphically the excellent results obtained by the introduction of the bonus plan in various shops. Invariably, where the system was gradually introduced, the employes were able to equal and frequently exceed the day's task. However, it was noticeable that on Mondays and Saturdays, many of the employes fell below the standard task set. One chart clearly showed apparent errors in fixing the bonus for a certain task, resulting in greatly increased remuneration for the workman. However, in such cases, it was urged that the task and the bonus be permitted to stand as set and under no conditions should the arrangement with the workman be altered. However, this error should serve as a note of caution to the taskmaster and he should exercise greater care in fixing the wage rate thereafter.

Time Studies by Moving Picture Machine

At the plant of the New England Butt Co., Providence, R. I., the moving picture machine has been employed for the purpose of making motion studies. In addition, a clock is employed, the hand of which makes 10 revolutions per minute, or 6 seconds for each revolution. The clock is located conveniently at the side of the workman whose movements are to be studied and each operation can be timed accurately in fractions of a second. J. Aldrich, vice president of the New England Butt Co., stated that as a result of these motion studies, the time required for assembling a braiding machine has been reduced from 28 to less than 7 minutes.

Robert T. Kent, who was engaged with Mr. Aldrich in making these studies, directed attention to the fact that the principle of measurement underlies and renders effective the three following principles: The systematic use of experience, the economic control of effort and the promotion of personal effectiveness which gives in concise form the method of attack on all problems of industrial management. Continuing, Mr. Kent spoke as follows:

"Micro-motion study is the most powerful tool ever offered the engineer to measure the efficiency of the worker. I do not believe that the engineers who have had this method presented to them for the first time can realize the vast importance of this method of making time and mo-

A. S. M. E. Honors Prof. John E. Sweet

Prof. John E. Sweet, honorary member and past president of the American Society of Mechanical Engineers, was tendered a dinner by the members of this organization at the Engineering Societies' building, on Wednesday evening, Dec. 4, in celebration of his eightieth birthday and in recognition of his valuable services to the engineering profession.

Age has dealt lightly with Prof. Sweet, whose mind is still keen and whose duties as president of the Straight-Line Engine Co., of Syracuse, N. Y., are discharged with the same vigor and the same interest in the company's affairs as at the time of its organization, 35 years ago.

Prof. John Edson Sweet was born Oct. 21, 1832, at Pompey, Onondaga county, N. Y., and after receiving a meager education at the local schools, he was apprenticed to the carpenter and joiner trade at the age of 18. Later he accepted a position in the office of Elijah T. Hayden, where he was principally engaged in making construction drawings for buildings. Later he was employed as a patternmaker and draftsman with the firm of Sweet, Barnes & Co., Syracuse, and during this period he developed a type-setting machine, of which the linotype in use today is a step in advance. This machine was exhibited in Paris, in 1867, and later was given to Cornell University. From 1871 to 1873, he engaged in bridge building, but during this period he developed the straight-line steam engine which won him great fame. From 1873 to 1879, Prof. Sweet taught mechanics at Cornell University, but later organized the Straight-Line Engine Co., which still operates a large plant at Syracuse.

Prof. Sweet was one of the organizers of the American Society of Mechanical Engineers and was elected its third president, in 1883. He served as one of the jurors on machine tools at the Chicago Exposition in 1893, and was the first president of the Engine Builders' Association of the United States, from 1899 to 1901. In 1906, he was elected president of the Syracuse Metal Trades Association and also is a member of the John Fritz Medal Association. His life has been one of great activity and he possesses the rare faculty of imparting to others his wonderful engineering knowledge.

tion studies. The use of the moving picture machine in connection with a clock which will measure time intervals to the half-a-thousandth of a minute, presents a means of studying operations or cycles of operations which occur too rapidly for the eye to follow and which, therefore, are impossible of study by the ordinary method of an observer with a stop watch.

Time Study Basis of Management

"Time study is the basis of all modern management. The provision of a machine to make time study should be as revolutionary in the art of time study as was the invention of the power loom in the art of weaving. Among other things it absolutely eliminates the human equation. It provides a method in which there is not only no possibility of error in measurement, but which furnishes at once a true statement of the time elapsed in the performance of any operation and a record and instruction card of the best method of doing a job.

"It was the writer's privilege to be present at many of the experiments which led to the development of micro-motion study and to observe how it was applied to the transference of skill and experience. Scientific management makes use of the best methods of all trades which can be transferred to the trade under consideration. The experiments under which micro-motion study was developed are an illustration of this point. The work involved was assembling of braiding machines, obviously a machine shop proposition. The original method of assembly involved the bringing of the various pieces to the job in a box or boxes from which they were taken as required by the worker. Many unnecessary motions were used in the transfer of the individual pieces to the growing machine. These unnecessary motions were promptly revealed by the moving picture machine. A bench which would bring the top of the completed machine at a convenient level for the workman was built and the parts were arranged in an orderly manner in bins behind him. This reduced the number of motions, but there were still more than were necessary.

Micro-Motion Study

"In other trades in which some of the experiments had been engaged it had been found advisable to group the units composing a single assembly on a packet arranging them in the order in which they were needed. This suggested a similar packet scheme for the parts of the braider. A horizontal packet was first made up and the motion picture machine revealed an irregularity and lack of rhythm in the movements of assembling which seriously cut down the efficiency of the workman. A change to a vertical packet and a standard height of portable assembly bench was thereby indicated and after a few experiments a new arrangement was devised. A packet was designed on which the various parts are hung on pegs in that exact position which micro-motion study has revealed as the most economical of motions both as regards time and length of travel. Micro-motion study revealed the deficiency of each method and permitted the development of the final accepted method in a small fraction of the time and expense which would have been necessary under the conditions which existed before its invention."

Increased Wages by Bonus Plan

Frederick W. Taylor, of Taylor system fame, was given an ovation when he arose to read his discussion. He deplored the fact that many distorted statements are being made regarding the efficiency of the bonus system. Invariably, he added, the wages of the workmen are increased from 30 to 100 per cent, and at a recent government investigation, it was shown that the wages of the workmen are 73 per cent higher than before the introduction of scientific management. He stated that the interests of both capital and labor are mutual instead of antagonistic, and when this principle is more generally recognized, there will follow a wider introduction of the principles of scientific management. Carl G. Barth, who has been associated with Mr. Taylor in the introduction of the Taylor system, stated that the labor purchasing agent suggested, is by no means a novelty, as one large firm, as early as 1895, employed such an agent at a salary of $5,000 a year. He was of the opinion that the piecework plan is still the best method of payment and referred to motion pictures for making time studies as an exceedingly interesting development. He added that the Taylor system and scientific management are analogous and to meet the views of those favorable to the adoption of the latter term, he styles himself an exponent of the Taylor system of scientific management. F. G. Coburn, U. S. N., said that in civil industrial pursuits, the increase in efficiency results usually in increased business and, therefore, the number of employes is not necessarily reduced. However, such is not the case with government work, which is limited, and as a result of the introduction of scientific management, in some instances the number of employes has been reduced two-thirds.

Ill-Advised Changing of Equipment

H. P. Kendall suggested that the man who does everything according to set rules "loses much of the fun in doing business." In a written discussion submitted by Tracy Lyon, of the General Motors Co., a source of great waste in shop management was referred to, which he characterized "the ill-advised changing of equipment doing good work for equipment expected to do better work." A written discussion also was presented by Prof. Dexter S. Kimball, of Cornell University. William Kent objected to the characterization in the report of scientific management as "labor-saving management." He said that labor-saving is only a small feature of scientific shop methods and in some cases does not enter into consideration. Industrial management he described as traditional, transitory and scientific. "Scientific management may not be new by 40 years," he added, "but the successful commercial application of it, is new."

H. H. Vaughan, assistant to the president of the Canadian Pacific railroad, who presented the minority report, gave his reasons for dissenting. He said that a formula for shop management could be prepared easily, but its application is an entirely different problem. He ridiculed any attempt by employers to ignore the skill of their workmen and he did not believe that fixed rules should be adopted to eliminate this skill. Mr. Vaughan added that he did not favor functional management, believing that the responsibility of the shop should be placed on the foreman. He favored bonus work where shop conditions were standardized, but believed that certain tasks could be accomplished more economically on a day wage basis.

Machine Shop Practice

One session was devoted to the discussion of machine shop practice and the sub-committee appointed to report on developments in this line of work during the last decade presented an exhaustive discussion of the advances that have been recorded during this period. Fred E. Rogers, chairman of this committee, presided at this meeting and presented the committee's report in abstract, which will be pub-

lished in full in an early issue of THE IRON TRADE REVIEW. It was stated that the operation of metal-working tools and their productive capacity are as much matters of machine design, arrangement and of management as of individual skill. In the past, productive capacity depended very largely on the skill and initiative of the workmen but now the rate of production, in many branches of manufacture, is almost entirely governed by the construction of machines so that the designer, when viewed in this light, is closely allied with shop practice. It was added that much of the improvement in machine shop practice has appeared in the improvement of machine tools themselves.

The various phases of the subject were treated under numerous subheads, as follows: Variety of machine shop practice, increased weight of machines, foundations, electric motor drive, automatic machines, training mechanics, scientific management, standardization of tool grinding, checking system for small tools, inspection of finished parts, the use of multiple tools, cooling lubricants, location of tools and lighting, drilling machines, lathes, wheel lathes, planer drives, milling machines, boring mills and boring machines, magnetic chucks, grinding machines, jigs and fixtures, gear-making, small tools, micrometers and gages, press working, heat treatment, autogenous frame welding and cutting, crane hoists and trolleys, accident prevention, etc.

The Vauclain Drill

"The Vauclain Drill" was the subject of a paper prepared by A. C. Vauclain and H. V. Wille. A new type of twist drill was described, which has two radial cutting edges, and in which the usual chisel point of such drills is eliminated. In this drill, the stresses due to the chisel point are absent and the arrangement of the cutting edges is such that a greater thickness of metal is secured at the center of the drill, adapting it to heavy feeds, by which means the most economical results are secured in drilling. Tables were included which showed the results of comparative tests with the Vauclain and regular types of drills which indicated a saving with the former of over half the horsepower expended with the latter type.

In the ensuing discussion, the ability to center the drill accurately was questioned, as were the tests which showed half the expenditure or horsepower as compared with the usual type of twist drill. It was stated that dynamometer tests made at the drill point did not indicate any difference in horsepower between the Vauclain drill and a twist drill of the standard type.

The Economics of Grinding

C. H. Norton, of the Norton Grinding Co., Worcester, Mass., presented an abstract of an exceedingly interesting paper entitled "Efficient Production of Cylindrical Work". It is presented in abstract as follows:

Early grinding machines were designed for the purpose of producing a higher degree of refinement than was possible with the lathe, both being used as tools of refinement. Later developments show that the highest efficiency is secured in the great majority of cases by using the lathe solely as a roughing tool, transferring the entire responsibility for refinement to the grinding machine.

The process of roughing is not to be considered in the usual sense of turning to a few thousandths of an inch over the finished size, since this involves an element of refinement and loss of time. The workman at the lathe should use the coarsest feeds possible without regard to finish, calipering the work at the beginning of a cut only, where the tool should be fed by hand for a short distance for this purpose. While a piece roughed-out in this manner may require a longer time for grinding than if roughed out more carefully with a certain degree of refinement, the combined time for the lathe and grinding machine will be less than if part of the refinement was done by the lathe.

Several examples are quoted by the author of work which has been ground in accordance with the principles outlined. It is held that lathe departments and grinding departments should be conducted under one head, instead of separately as is usually the case, to avoid the tendency of the lathe department to consider its work as a finished product, and of the grinding department to insist on careful turning in order to make a better showing of time required for grinding.

Great interest was manifested in the results reported by Mr. Norton and in the ensuing discussion it was stated that the grinding problem should be investigated carefully and, if possible, the two methods suggested by Mr. Norton should be combined so as to effect the greatest economies in machine shop operations. William Kent suggested that the results be tabulated, particularly in view of the fact that efficiency engineers undoubtedly will be greatly interested in the results and that they naturally seek for tabulated information on a subject of this kind. In reply, Mr. Norton said that partial tabulated results were presented in one paragraph of his paper.

Prof. Sanford A. Moss presented an exceedingly interesting paper entitled "Increase of Bore of High Speed Wheels by Centrifugal Stresses". Formulae for force and shrink fits were included. An abstract of the paper is herewith presented:

Unless proper precautions are taken, a high-speed turbine wheel expands at the hub a sufficient amount to cause an appreciable increase in the bore so as to make the wheel slightly loose upon the shaft, soon causing distress. The paper contained a general discussion of stresses in a rotating wheel; a mathematical method for computation of the increase in bore of a rotating wheel due to centrifugal stresses; an investigation of the actual numerical value of the increase of bore under various practical conditions; an experiment giving an actual measurement of the increase in bore of a wheel at high speeds, showing close agreement with computed values; a description of methods of preventing damage due to the increase of bore by using large amounts of force fit; and a mathematical treatment of force fits.

The increase of circumference of the bore is proportional to the original circumference and the tangential stress and inversely as the modulus of elasticity. In the experiments the readings showed that the bore expanded at each speed an amount almost exactly equal to the computed values.

For a wheel with 12-inch bore and 30,000-pound maximum stress, which is permissible with special grades of steel, this increase of bore comes out over 0.01 inch, which gives an appreciable loosening of the shaft fit. A complete treatment of the subject of force and shrink fits based on the maximum shear law is given for the first time so far as known.

When the hub is in place on the shaft, it is expanded by a certain amount and the shaft is also compressed by a considerable amount. The ratio of expansion of the hub to the total force fit is the same for a given wheel and shaft regardless of the amount of the force fit. A curve is given showing values for various cases. Curves are also given showing values of radial stress at the bore of the hub which is also the pressure between hub and shaft, and the maximum effective stress at the bore of the hub which is usually the greatest stress in the system. The usual case of a shaft with a comparatively small hole is practically equivalent to a solid shaft for these matters.

Strength of Gear Teeth

"The Strength of Gear Teeth", by G. H. Marx, recorded experiments made with a view to securing data upon the allowable unit fiber stress for cast iron gear teeth when in operation. The gears tested were all of 10 diametral pitch, 14½-degree involute, 1 1/16-inch face. Comparisons were made of these results and of those given by the use of the Wilfred Lewis formula, together with a discussion of such discrepancies as were found to exist. Practical suggestions were included covering the propor-

tions of gears based upon the observed manner of breaking of the various gears tested. The discussion of this paper covered a wide range and while the value of the tests was appreciated, it was suggested that other means of testing might be tried and that much additional valuable data might be obtained thereby. Testing these gears to destruction involved a large expenditure and it was stated that the data presented are the most valuable on the subject of gears since the memorable investigation made by Wilfred Lewis, of the Tabor Mfg. Co., Philadelphia.

Efficiency of Worm Gearing

Prof. Wm. H. Kenerson reported the results of an investigation of the efficiency of worm gearing for automobile transmission. Data regarding the shape and construction of the gears were given and the results were tabulated and also were expressed in graphic form. The results indicate a high efficiency and large carrying capacity. It was stated by one of the members that an instrument has been devised to detect the error of spacing in gears. He said that the results are surprising, as it will be found frequently that many of the teeth do not touch, notwithstanding the great care exercised in the cutting of the gears. It was evident that the subject of cut gears is of paramount importance in the building of precision machines, but no means were suggested whereby minute errors which exist today can be overcome.

Rules For Power Plant Tests

A number of reports of technical committees occupied one entire session and great interest was manifested in the codes and recommendations presented. An exhaustive treatise on "The Rules for Conducting Performance Tests of Power Plant Apparatus" was presented in preliminary form by D. S. Jacobus, consulting engineer of the Babcock & Wilcox Co., on behalf of the sub-committee of the power test committee. This report embraced a section giving general instructions regarding tests and a second section, containing individual codes for different equipment. These codes outlined methods for testing boilers, reciprocating steam engines, steam turbines, complete steam power plants, pumping machinery, complete pumping plants, compressors, blowers and fans, locomotives, gas producers, gas and oil engines, complete gas power plants and water wheels. The third section is made up of voluminous appendices. The codes presented were discussed in detail and numerous suggestions were made for revisions in the test rules. Among those who discussed the codes were C. D. Young, Pennsylvania railroad, Altoona, Pa.; A. A. Cary, New York, consulting engineer; A. B. Carhart, of the Crosby Steam Gage & Valve Co., Boston; W. F. M. Goss, of the University of Illinois; Prof. F. R. Hutton, New York, consulting engineer, and others. A written discussion by Col. E. D. Meier complimented the committee on its work and suggested that the codes be made so complete and explicit that they might be used with equal success by the less experienced engineer as by the man with large practice. The committee will continue its work and will give attention to the suggestions for revision of the codes and appendices before presenting a final report.

Standard Cross-Sections

The committee on standard cross-sections and symbols urged the society to adopt standard cross-sections. These should be printed in a suitable form for hanging on walls of drafting rooms of engineers, architects and educational institutions, so as to encourage their universal use. Standard cross-sections of 19 materials were recommended, as follows: Cast iron, wrought iron, cast steel, wrought steel, babbitt or white metal, copper, brass or composition, aluminum, rubber, glass, wood, water, puddle, concrete, brick, rubble, ashlar, rock, earth and sand. If materials, other than those specified, are to be used, the name of the material is to be written on the material and the section is to be cross-hatched. Subdivision of any of the materials named should be made by taking one of the standard cross-sections as a basis and making minor changes, but maintaining the general characteristics. By slight changes and by the insertion of the name of the material, wrought steel can be subdivided into nickel, chrome and vanadium steels.

Standard Sizes of Catalogs

Prof. Wm. Kent presented a preliminary report on the committee of standard sizes of catalogs. The following sizes were recommended: Index card, larger sizes, 4 x 6 and 5 x 8 inches; folders, small, 6 x 3⅜ inches; large, 8 x 3½ inches; catalogs, standard size, 6 x 9 inches; bulletins and large catalogs, standard, 8½ x 11 inches; bulletins and large catalogs, smaller than standard, 8 x 10½ inches; transactions of societies, pamphlets, etc., 6 x 9 inches; catalogs, extra large, and technical press, 9 x 12 inches. In addition to the sizes specified, the committee made the following recommendations:

For paper-covered catalogs intended to be permanently filed, the edges, including cover, should be trimmed to exact size. No fancy deckled edge or dark-tinted paper should be used.

Overlapping edges of the cover are permitted when the catalog is bound in covers stiff enough to support its weight in boards or heavy card paper.

The title should always be printed on the exposed back of the catalog, even in very thin stitched books, for the purposes of identification.

Every catalog should have a date on its title page.

A standard size index card, 3 x 5 inches, should be enclosed in each catalog, with the title of the book and a brief statement of the character of its contents printed on it.

Flanges and Fittings

A progress report was made by the committee on flanges and fittings. To this report was affixed a list of 89 manufacturers and 25 dealers who, it is stated, were prepared to furnish these products, in accordance with the 1912 United States standard. It has been proposed to increase the standards on flanges from 30 to 100 inches, on high-pressure fittings to 48 points and on low pressure, to 100 inches. This report was discussed by Prof. W. H. Kenerson, of the General Fire Extinguisher Co., Providence, R. I.; A. B. Carhart, of the Crosby Steam Gage & Valve Co., Boston, and others. It was the consensus of opinion that it would be unwise for the society to publish any list of names of manufacturers observing the standard which it was known was not complete. Henry Gombers, secretary, National Association of Steam and Hot Water Fitters, addressed the society along this line stating that all the manufacturers had had an opportunity to subscribe to these specifications.

A report on pipe threads made by E. M. Herr, of the Westinghouse Electric & Mfg. Co., chairman of the committee in charge of this work, reported the progress that is being made. The committee stated that an international commission would consider this subject carefully and it was believed that at the next meeting a favorable report could be presented to the society.

The Use of Lignite

Prof. Calvin S. Crouch, of the University of North Dakota, gave the results of experiments with North Dakota lignite in steam power and

gas producer service which were conducted at the University of North Dakota. The author stated that one-half of the area of North Dakota or about 35,000 square miles, is underlaid with lignite. In 1911 about 466,000 tons were mined. In this paper were reported some preliminary experiments showing the physical properties of the coal and the results when subjected to heat and the drying action of air; also two evaporative tests and 18 gas producer power plant tests, in which the coal was used as it came from the mine, except that it was broken so as to be charged easily into the gas producer.

The results of the evaporative tests, though not as satisfactory as could be desired, indicated the possibilities of its use for such purposes and the improvements needed in furnace operation to burn it properly. The producer plant tests were highly satisfactory, showing that the coal could thus be utilized without special treatment and that the gas operated satisfactorily in the gas engine, giving a coal consumption in some of the longer tests of about 6½ pounds of coal as fired per kilowatt-hour at the switchboard for power available for outside purposes.

Large Pump Valve

Prof. Wm. Kent read the paper on "The Baltimore Sewerage Pump Valve", prepared by A. S. Nagle. The results were presented of experiments made by the Bethlehem Steel Co., with a small experimental pump to determine the best proportions of the pump valve to be used in the Baltimore sewerage pumping engine. The experiments showed that a plain, flap valve with a seat angle of 60 degrees with the vertical plane, weighing about 0.26 pound per square inch (in water) of seat opening, or 0.30 pound in the atmosphere, measured normal to the face of the valve, will give a quiet and prompt working valve up to fully 30 revolutions per minute.

A discussion of the theory involved in the action of the valve, namely, that the velocity of the flow through the valve opening corresponded quite closely to the velocity due to this head or weight, held very fairly. Also that on opening, the valve lift was in perfect synchronism with the plunger velocity at any speed. In closing the valve lagged behind for the greater part of its descent, but at the speeds given always reached its seat at the end of the stroke without shock.

"Measurement of Air and Fan Work," was discussed in a paper prepared by Chas. H. Treat, of Honor, Mich., and presented by Professor Thomas. The paper discussed the use of the pitot tube for fan testing with particular emphasis on the correct kind of tube to be used. It described simple and accurate methods of calibration of impact and static orifices, and the instruments to be used in fan testing, as well as the general method and arrangement of the tests. It showed, further, the derivation of the formula for friction in test pipe, and the method of correcting test results to standard weight air.

Sanford A. Moss, of the General Electric Co., J. H. Browne, of the R. D. Kimbal Co., W. H. Carrier, of the Buffalo Forge Co., and others, discussed the paper. Mr. Carrier declared that under the best conditions, fan efficiency ranges from 70 to 75 per cent, while under ordinary operating conditions, the efficiency is from 45 to 60 per cent.

An animated discussion was provoked by the paper on "The Centrifugal Blower for High Pressures," by Henry F. Schmidt, of the Westinghouse Machine Co., East Pittsburgh, Pa. In this paper, the author gave the essential elements of blower design in convenient form for reference.

R. H. Rice and Prof. Sanford A. Moss, of the General Electric Co., attacked the author's conclusions as to the respective efficiencies of guide-vane and volute types of blowers. The author's statement that a straight, radial blade is the only type that can be used except at the lowest speeds to withstand the stresses in centrifugal blowers, was questioned by these speakers. Mr. Christie disagreed with the author's statement that no riveted nor built-up blades should be tolerated. He cited recent cases where users have abandoned solid blades in favor of the built-up type. A written discussion of this paper was presented by C. G. De Laval, of the International Steam Pump Co.

Among the large number of papers presented and only briefly discussed, were the following: "Air in Surface Condensation," by Geo. A. Orrok; "Tests of a 1,000-Horsepower Babcock & Wilcox Boiler," by B. N. Bump; "Dimensions of Boiler Chimneys for Crude Oil," by C. R. Weymouth, and "Case Carbonizing," by Marcus T. Lothrop.

Dinner to Professor Sweet

Prof. John Edson Sweet, known as the father of the American Society of Mechanical Engineers, inventor of the straight-line steam engine and pioneer instructor of mechanics arts, was the guest of honor at a dinner tendered by his friends and admirers at the Engineering Societies' building, Wednesday evening, Dec. 4, in celebration of his 80th birthday and in recognition of his great services to the engineering profession. This event was marked by a display of profound respect and deep reverence, not alone for Prof. Sweet's achievements, but for his love of mankind, which endears to all with whom he comes in contact.

With Mrs. Sweet at his side, the great inventor stood in the receiving line for more than an hour, greeting those who had come to pay him tribute. Ambrose Swasey, of the Warner & Swasey Co., Cleveland, presided, and the first speaker introduced was Dr. Alex. C. Humphreys, retiring president of the society, who delivered the address of welcome. He was followed by Capt. Robert W. Hunt, who responded on behalf of the American Society of Mechanical Engineers, while Prof. Albert W. Smith, of Cornell University, one of "Prof. Sweet's boys," told of the early days and experiences at the Sibley school, where Prof. Sweet taught the science of mechanics. In his characteristic manner, Dr. John A. Brashear, of Pittsburgh, discussed "The Beautiful in Science," and he attributed much of his success to one of Prof. Sweet's straight-line steam engines, which furnished the motive power for the machinery in his shop employed in grinding lenses for some of the largest telescopes in the world.

Epoch-Making Inventions

The response by Prof. Sweet reflected his great mind, unimpaired by age. He traced the epoch-making inventions introduced during his long life and displayed a wonderful appreciation of their importance in the world's industrial developments. Among the large number of telegrams of regret, was a message from John Fritz—90 years young. A brief reference to his slight feebleness, which he assigned as the cause of his non-attendance, was the only pathetic note of an otherwise cheerful greeting. Great applause followed an announcement by Mr. Swasey that John Fritz is slowly recovering from his recent severe illness.

The Baldwin Chain & Mfg. Co., Worcester, Mass., is adding two floors to one of its buildings, 80 x 60 feet in size, and a one-story addition, 70 x 40 feet, also is being erected. The capacity of the plant will be increased approximately 60 per cent.

THE IRON TRADE REVIEW

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Our Present Blast Furnace Capacity

Under the above caption, *The Bulletin* of the American Iron and Steel Association, for Dec. 1, states that the total annual capacity of the active and idle blast furnaces of the country on Nov. 30, amounted to 42,893,000 tons. This capacity is made up as follows, in the words of *The Bulletin*:

Total annual capacity of furnaces active on June 30, 1912, 30,250,000.

Total annual capacity of furnaces idle on June 30, but since blown in, 5,198,000.

Annual capacity of one furnace building on June 30, but since blown in, 20,000.

Total annual capacity of furnaces idle on June 30, and not blown in to Nov. 30, but which we are advised may resume work in 1912 or 1913, 1,986,000.

Total annual capacity of furnaces idle on June 30, which had not resumed work to Nov. 30, the time for blowing in of which is indefinite, but which have made pig iron since 1908, 3,673,000.

Total annual capacity of furnaces idle on June 30, still idle on Nov. 30, and which have long been idle, and some of which may never again make pig iron, 1,766,000.

Total annual capacity on Nov. 30, 42,893,000.

As showing the total physical capacity of the blast furnaces of the country, these statistics are of some interest, but they are far from representing the actual available blast furnace capacity. In editorials published by THE IRON TRADE REVIEW Nov. 7, 1912, and June 13, 1912, the difference between the physical and commercial pig iron capacity of the country was discussed and explained. The capacity of the physically fit furnace is not the matter of first importance. The supply of coke and ore must first be considered. This fact is being shown in a very impressive manner at present by the high prices and inadequate supply of coke in the Connellsville region. The figures of *The Bulletin* do not change our opinion as to the present available capacity, which we recently estimated at about 34,000,000 tons. It is doubtful whether coke and ore could be obtained to operate that capacity.

Whither Are We Drifting?

In the recent decision of the arbitration committee appointed to pass upon the demands of the locomotive engineers on the roads east of Chicago and north of the Ohio river, for increased wages, the arbitrators frankly admit that they were unable to arrive at a conclusion regarding the ability of the roads to pay the increased compensation, but state that they were agreed on the principle that the engineers should be paid a fair wage. Hence, certain advances were ordered, and other demands of the engineers were not granted. The arbitrators suggest that the roads, in order to meet increased cost of operation, can ask leave to raise rates. In this way, the first step is taken toward establishing an endless chain of increased cost to the shipper; that is, the labor union goes to the arbitration board for higher wages, and, in turn, the railroad has to go to the Interstate Commerce Commission for permission to charge higher freight rates. The question naturally suggests itself—When is this endless chain to be broken?

Another important decision, that of the supreme court declaring the merger of the Southern Pacific and the Union Pacific railroads illegal, also suggests important questions. How the decree is to be worked out in all its details, presents a problem which is worrying all who are directly connected with these great properties. The Union Pacific has three months to make a trade with the holders of outstanding Southern Pacific shares for control of the Central Pacific and next to dispose of its $126,500,000 in Southern Pacific holdings. Whether there will be a real dissolution or not, remains to be seen. The question which concerns the public is what good can come from dissolution, if wages are to be controlled by arbitration and freight rates by the Interstate Commerce Commission?

We believe these recent decisions bring up squarely the question whether anything is to be gained by the dissolution policy. Why try to dissolve that which is controlled?

Record Pig Iron Production

A new record rate of pig iron production in the United States was made in November, passing the previous record, which was made in February, 1910. In our monthly blast furnace report, published a week ago, it was observed that the previous record rate was made by the average daily production of 86,748 tons in February, 1910. This year, October production was at the rate of 86,569 tons, while November production was at the rate of 87,827 tons.

The striking fact, however is not that a new record

was made in November, but that it was so late as November that the record made nearly three years ago was surpassed. With such great activity in the iron and steel industry in recent months, it might have been expected that a new record would earlier have been attained. The fact is brought home that our pig iron capacity has not been increasing rapidly in the past two or three years. The trade experienced a great shock five years ago, when the production of pig iron decreased from October, 1907, the panic month, to the following January by more than 50 per cent. Not only was this a terrible decline, but there were many new furnaces being built at the time, promising a much larger capacity than that which was active in October, the record month. For two years or so, while the new construction program was being completed, pig iron capacity increased rapidly, but thereafter it increased very slowly.

When the record rate of pig iron production was reached in February, 1910, it was fairly generally recognized that the output was abnormal, that the furnaces in existence could not keep up the pace indefinitely. During the dull period, all furnaces which stood in any need of repairs had been gotten into good shape, and practically the entire force could be active, without the usual 5 to 10 per cent of fit capacity being out for relining and other repairs. The production in February, 1910, was at the rate, with an allowance for the charcoal pig iron production, not given in our returns, of about 31,800,000 tons a year, but it is probable that had the furnaces then in existence been called upon to do their best for a twelvemonth, they would not have been able to produce much over 30,000,000 tons of pig iron in the period.

The actual demand for pig iron, with a production rate of somewhat over 32,000,000 tons a year, is very much heavier than it was early in 1910. At that time, pig iron was being produced in excess of requirements. Consumers had bought heavily as the market advanced, and were taking in iron which they did not need, while some furnaces were accumulating iron speculatively. During 1910, a large stock of pig iron was accumulated. At the present time, production and consumption are very closely adjusted. For several weeks, there have been practically no stocks to draw from, while it is quite certain that no stocks are being accumulated. The trade, while making only a little more pig iron than at the maximum nearly three years ago, is consuming considerably more and in every respect the market is in a much sounder position.

A close forecast can now be made of this year's pig iron production. Production in the first half, as officially reported by the American Iron and Steel Association, was 14,072,274 gross tons. Production of coke and anthracite iron in the five months, July to November, according to our monthly reports, was 12,665,631 tons. Estimating December production at the same daily rate as November, and allowing for a charcoal pig iron production equal to that in the first half, the total production in the second half of the year promises to be about 15,550,000 tons, or approximately 1,500,000 tons more than in the first half, and the year's production is likely to be within 100,000 tons either way of 29,600,000 tons. This compares as follows with the output in the past five years:

1907....25,781,361	1910....27,303,567
1908....15,936,018	1911....23,649,547
1909....25,795,471	1912....29,600,000

A new calendar year record is thus being made by about 2,300,000 tons. The ups and downs in pig iron production are well illustrated by the fact that while it is not until November that we reach a higher rate than was reached in 1910, yet this year we shall make more than 2,000,000 tons more pig iron than in that year. In 1910, production fell rapidly, while in 1912 it increased with relative slowness, having started at a much higher rate than the lowest rate in 1910.

English in Technical Schools

While the education of the engineer, as provided for by the technical schools, has kept pace well with the progress of the times, as far as technical knowledge is concerned, it has long been evident that little or no attention has been paid to the matter of training an engineer to express himself clearly and concisely, either orally or in writing. In this respect, engineering schools associated with universities are perhaps less open to criticism than institutions which are devoted solely to engineering and its various branches. In the case of some of the former, certain courses in languages, German, French, Spanish, etc., have been required of graduates, but in most cases instruction along such lines has not been thorough, and little, if any, attempt has been made to broaden the culture of students. Few institutions have required any knowledge of English or rhetoric, other than that given in the high schools and constituting a part of the college entrance requirements.

It is pleasing to observe, therefore, that at least one technical college, which had been conspicuous for the omission of English and other languages from its curriculum, has at last realized the importance of these subjects in an engineer's education. The Michigan College of Mines, at Houghton, Mich., last year offered, experimentally, two courses in English and the writing of reports. These received the hearty support of the student body and the result has been that four new courses under the head of technical writing are being offered this year. Of these, two will be required for graduation and two will be optional. The courses include: Elements of technical writing; forms of technical discourse; technical journalism and business correspondence, and John D. Black, a graduate of the University of Wisconsin, is at the head of the new department. There can be no question that this departure will fill a long-open gap in engineering education at the college at Houghton. The astonishing fact is that any college should have existed so long without requiring courses which would enable the students to acquire at least a fair knowledge of English.

John Fritz Medal Awarded to Capt. R. W. Hunt

One of "Uncle John Fritz's Boys" Has Great Honor Conferred Upon Him for Aid in Development of the Bessemer Process

Capt. Robert W. Hunt, of the firm of Robert W. Hunt & Co., Chicago, on Thursday evening, Dec. 5, was the recipient of the highest honor that can be conferred upon an American engineer. Before an assemblage of distinguished engineers that crowded the auditorium of the Engineering Societies' building, New York City, he was presented with the John Fritz medal and diploma for his contributions to the early development of the Bessemer process.

The formal address was delivered by Dr. John A. Brashear, of Pittsburgh, who vividly portrayed the iron industry of the Smoky City as it was carried on in the 60's and 70's, and recounted some of the great achievements of the 1912 John Fritz medallist.

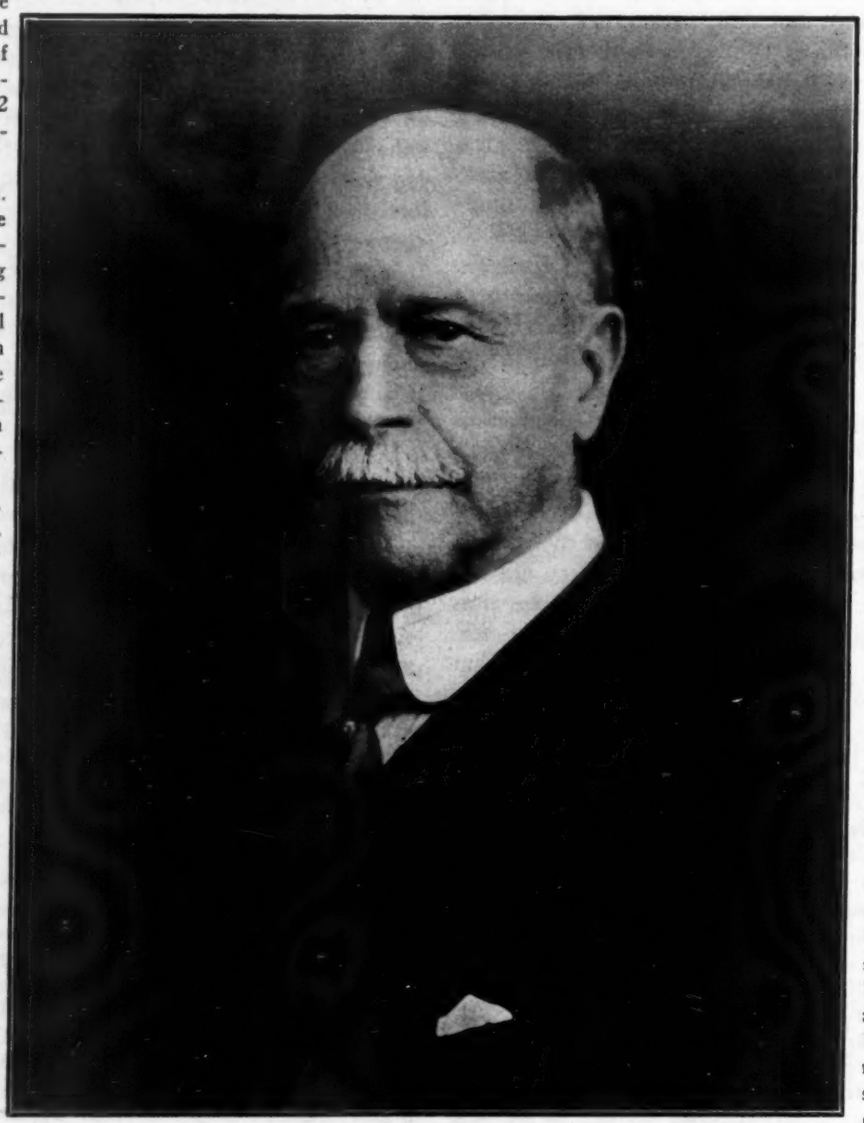
President Wm. Kemp, of the American Institute of Mining Engineers, presided, and the medal and diploma, on behalf of the board of engineers of the John Fritz Medal Association, were presented to Capt. Hunt by E. G. Spillsbury, of New York City.

Dr. Henry S. Drinker presented a message which had been given him personally, that day, by John Fritz, at the latter's home, Bethlehem, Pa. This message was addressed to the members of the four national engineering societies and is as follows:

"I wish to convey to you through my friend, Dr. Drinker, my very hearty greetings and to express my great pleasure and satisfaction over the award by your committee of the medal bearing my name to my beloved, old friend, Capt. Robert W. Hunt. No worthier selection could have been made. He is a man so distinguished, so able, so deservedly prominent in the engineering profession, that there can be no question about the wisdom of your choice. I only wish I could be with you tonight, but my physical condition is not as yet such as to permit it. I can, however, thank God for the improvement in my strength and health since my operation last spring, and I hope that I still may have the pleasure of meeting you all on some future occasion."

On the rostrum of the auditorium, where the exercises were held, were seated the officers of the four national engineering societies, namely the American Institute of Mining Engineers, the American Society of Civil Engineers, the American Society of Electrical Engineers and the American Society of Mechanical Engineers. Following the award, a reception was tendered to Capt. Hunt.

In his acknowledgment of the great honor which had been conferred upon him, Capt. Hunt described some of the difficulties that beset the perfection of the Bessemer process in this country. His response, in part, was as follows:



CAPT. ROBERT W. HUNT

"The history of the early days of the Bessemer process, is almost, if not really, romantic, and would be impossible under present conditions.

"Since then progress has been made in chemical and other metallurgical research, that what was then almost mysterious is now not only understood, but known to be controllable under recognized laws. When we recall that Bessemer himself announced that iron containing more than a trace of phosphorus was unsuitable for his process, and that later analyses of steel made by him and others about that time have given numerous instances of considerably over 0.10 per cent of that element, we can

appreciate that the then supposed chemical knowledge was not very accurate.

"Experience with refractory materials had been very limited, particularly when used in contact with molten metal at high temperatures. Engines to blow air at high pressures and in large volumes were undeveloped. The use of electricity as power was unknown, and many other quick-acting and labor-saving developments have been of subsequent years.

"I recall those conditions by way of emphasizing that things which would today be easy, were then hard; but we had the benefit of an element, which, under our then environments, exercised a greater power than I believe would be possible today, and that was personal friendships. In the earliest days of the Bessemer process in America, there were but two Bessemer plants, at first controlled by rival interests, but soon merged under one controlling power so far as the Bessemer and other patents were concerned, but remaining distinct in other commercial aspects. The result was that the men operating the slowly-projected additional plants, were comparatively few in number, and were naturally drawn together by their common difficulties. This spirit of comradeship was largely inaugurated and fostered by the commanding intellect, and, more than all, by the love-compelling personality of the man who became the consulting engineer to most of the works—Alexander Lyman Holley. A bond of brotherhood existed under which one man's difficulties were the concern of all the others, and the means by which one overcame a trouble was at once added to the knowledge of all the others. I do not believe such a condition would today be at all possible, but it existed then. And what a coterie it developed—A. L. Holley, George Fritz, Captain Wm. R. Jones, John E. Fry, Robert Forsythe, and a little later D. N. Jones, Owen Laibert, Theodore R. Wolf and Horace Smith, with Uncle John Fritz as our constant adviser and monitor. Wm. F. Durfee, John C. Thompson, John B. Pearce, H. S. Nourse and others were also among the early workers, and did many notable things, but they were not exactly members of the 'Order of the Boys'.

First American Steel Plant

"Personally, it was my fate to be sent, on May 1, 1865, by the Cambria Iron Co., to the experimental Bessemer, or rather, as it was then called, Kelly process plant at Wyandotte, Mich., in which the first heat of pneumatic steel blown in America had been made in the fall of 1864, and, from that day until March 31, 1888, my life was directly connected with Bessemer steelmaking.

"The converters at Wyandotte had a capacity of only 2½ tons, and were located in the casting house of a charcoal blast furnace, so that direct metal could be used, and, under Wm. F. Durfee's direction, it was accomplished, but the regular, or I better say irregular practice, was to use metal which had been melted in an air furnace, thus following the European method of procedure. Later, under Z. S. Durfee's direction, we made a heat from iron melted in a cupola located in an adjacent foundry, and still later, I replaced the air furnace by a cupola, and this inaugurated that which later became the regular American practice. We also, in a somewhat crude way, developed the bottom-casting of ingots. Later, at the Pennsylvania Steel Co.'s plant, and more thoroughly at the Cambria plant, while under my management, that practice was perfected, A. L. Holley, Wm. R. Jones, John E. Fry and I, uniting in the protecting patents. The Cambria works had the good fortune to roll the first steel rails made in America on a commercial order, from ingots cast in the Pennsylvania Steel Co.'s plant at Steelton, Pa., their rail mill not being completed, and the Pennsylvania Railroad Co. being anxious to try some American-made Bessemer rails. I had charge of the rolling under the direction of George Fritz, chief engineer and general superintendent of the Cambria works, and the event was made more notable by Mr. Fritz experimentally demonstrating that the reduction of steel into blooms by rolling was preferable to performing that work by hammering, as was then the universal practice.

Slagging Iron For Steel

"At Cambria we first perfected the practice of tapping slag from the cupolas in which the iron for conversion was melted and thereby made possible a much larger output of steel. Previously it had been only possible to keep a cupola in operation not exceeding 24 hours, but the cinder tapping increased the run to three or four times as long a period.

"The years, 1877 and 1878, were

Capt. R. W. Hunt, John Fritz Medalist

Capt. Robert W. Hunt, John Fritz medalist, is president of the American Society for Testing Materials, and head of the testing and inspection bureau of Robert W. Hunt & Co., Chicago. He was born at Fallsington, Bucks county, Pa., Dec. 9, 1838, and was educated at Covington, Ky. He worked in a rolling mill at Pottsville, Pa., where he successively became a puddler, heater and roller. In 1859, he studied analytical chemistry at Philadelphia and in 1860 established the first chemical laboratory in America to be operated as a department of an iron and steel manufacturing plant, at the works of the Cambria Iron Co., Johnstown, Pa. With the advent of the Civil War, his work temporarily was interrupted, but after having been mustered out of service, he returned to the employ of the Cambria Iron Co., in 1865, and was sent to the experimental Bessemer plant partly owned by this company, located at Wyandotte, Mich. In 1866, he returned to Johnstown and assisted George Fritz, chief engineer of the Cambria Iron Co., in the design and construction of this company's Bessemer plant, of which he had charge from 1871 to 1873. He was next appointed superintendent of the Bessemer works operated by John A. Griswold & Co., Troy, N. Y., and upon the formation of the Troy Steel & Iron Co., in 1875, he was appointed manager of its operations, remaining in charge of this work until 1888. He then established the testing and inspection bureau of Robert W. Hunt & Co., Chicago, of which he is still the head.

Capt. Hunt has twice served as president of the American Institute of Mining Engineers, respectively in 1883-4 and 1906-7. In 1890-91, he served as president of the American Society of Mechanical Engineers. In 1893, he was elected president of the Western Society of Engineers, Chicago. Capt. Hunt is the inventor of numerous steel and iron metallurgical processes and was one of the designers of the Hunt-Jones-Suppes rail mill feed table. In recent years he has devoted much of his time to a study of the steel rail problem, and he has contributed liberally to technical societies on the progress of his rail research work.

dull in steel rail making, and as the Albany & Rensselaer Steel & Iron Co., Troy, N. Y., had extensive iron merchant mills in addition to their steel rail mill, and as the general superintendent of the company, I was naturally anxious to have the steel works and as many trains of rolls as possible kept busy, and taking lessons from the Swedish exhibit of Bessemer steel products at the Centennial Exposition, I induced our people to take up the making of special steels by the Bessemer process. In that work I had the able assistance of Dr. August Wendel, the works chemist, and I believe I am safe in claiming that we were the American pioneers in making such steels, which embraced steel for carriage and wagon axles, drop forgings of all kinds, scythes, rifle and musket barrels, springs, and even rock drills, the steels ranging in carbon content from less than 0.10 to 1 per cent, and the Troy products enjoyed an enviable reputation. Dr. Wendel and I united in securing several patents, covering what we considered important features of the production.

"Following a change in the ownership of the Troy works, among other alterations and additions, we remodeled the steel rail mill, and I embraced the opportunity to install automatic machinery for handling the steel while being rolled into rails. We formerly required 14 men for this work, but we reduced this number to four, and lessened their physical labors. Max M. Suppes was the master mechanic of the works and gave me valuable assistance, and we united in some of the patents protecting this device. Following the successful operation of this equipment, Capt. Wm. R. Jones, general superintendent of the Edgar Thomson works, attached automatic tables to that rail mill, under license from us, and as he added some new features which he protected by patents, he pooled his interests with Mr. Suppes' and mine and together we subsequently granted licenses to a number of the principal rail mills. Naturally, the able gentlemen in charge of the different mills made improvements upon our plans, as they adapted them to their several requirements. Other engineers have devised labor-saving automatic rail rolling machinery, but such is the history of the Hunt, Jones, Suppes tables and the beginning of American automatic rail rolling."

Marshall blast furnace at Newport, Pa., is being prepared for operation when needed. The stack has been completely overhauled.

CARNEGIE VETERANS

Recall Days In Mills at Annual Dinner of Steel Masters.

Former employes and associates of Andrew Carnegie gathered at the New York City home of the steelmaster, Friday evening, Dec. 6, for the 11th annual meeting of the Carnegie Veteran Association, and in a reminiscent vein lived over again their active days in the mills and at the furnaces of the Carnegie Steel Co. Mr. Carnegie was in particularly happy frame of mind at the dinner and at the speechmaking which followed and he delivered one of his characteristically felicitous talks to his "old boys" and "young partners." Speeches were also made by Charles M. Schwab, H. P. Bope, J. H. Reed, John McLeod, A. C. Dinkey, W. E. Corey and others, while W. B. Dickson delivered an especially-prepared poem.

At the meeting of the association which preceded the dinner, Mr. Carnegie was re-elected to his accustomed post as president, Mr. Schwab was made vice president and Charles L. Taylor, secretary.

Besides the speakers, those present at the reunion, all of whose names have been prominently associated with the iron and steel industry, were as follows:

Charles W. Baker, W. R. Balsinger, P. T. Berg, W. W. Blackburn, J. J. Campbell, Albert C. Chase, D. M. Clemson, A. C. Dinkey, R. A. Franks, A. R. Hunt, F. H. Kindl, George Lauder, Thomas Lynch, Edwin S. Mills, A. O'Neil, Thomas Morrison, Geo. E. McCague, W. C. McCausland, Gibson D. Packer, Wm. P. Palmer, A. R. Peacock, Lawrence C. Phipps, J. H. Reed, J. E. Schwab, James Scott, Emil Svenson, H. E. Tener Jr., E. H. Utley and Geo. H. Weightman.

Greetings were cabled by John G. A. Leishman, ambassador to Germany, and by Millar Hunsiker, of London. Messages also were received from William L. Abbott, of Pittsburgh; John C. Fleming, of Chicago; D. G. Kerr, J. A. Potter, of Los Angeles, and E. F. Wood, of Los Angeles, all Carnegie veterans, who were unable to be present.

William Cramp & Sons Ship & Engine Building Co., Philadelphia, has been awarded contracts for the construction of three out of the six torpedo boats for which bids were recently opened. The price is $842,000 each. The New York Shipbuilding Co. received the contract for one at $873,500. One will be built by the Bath Iron Works, Bath, Me., for $810,000, and one by the Fore River Shipbuilding Co., Quincy, Mass., for $873,000.

FOR HUNDRED YEARS

Philadelphia Concern Was in Business—Affairs Being Closed.

Philadelphia, Dec. 9.—The liquidation of the assets of the C. C. Knight Co., Philadelphia, which ceased actual business several months ago, is now well on the way toward completion, and the history of this concern will soon be entirely in the past. Its passing is viewed with regret in view of the many old connections which of necessity have come to an end.

Founded in 1812 by Joseph Knight, the firm at first dealt in iron and steel merchant products and, later, in coal. When Joseph Knight died, the business, according to the time-honored Philadelphia custom, passed into the hands of his son, C. C. Knight. When the latter died, his son, Joseph Knight, succeeded him and maintained the direction of the company's affairs until 1909, when he succumbed, at the age of 38, to typhoid fever. He was the last of the Knights in the business.

The C. C. Knight Co. was the second oldest house of its kind in Philadelphia. The oldest is the Ellicott Fisher Co., which has had a continuous existence since 1783. Founded by a Mr. Jones, a Quaker, who dealt in merchant iron and steel, it passed successively into the possession of Jonathan Leedham, Clarence Cresson, Cresson & Ross, Fisher & Ross and Ellicott Fisher. The latter incorporated the business in 1891, under its present title. The company now deals in merchant iron and steel and specializes in horse shoers' supplies.

Other old Philadelphia merchants in this line are Morris, Wheeler & Co., Horace T. Potts & Co., and W. F. Potts, Son & Co. The former was founded in 1828, as Morris & Jones & Co. W. F. Potts, Son & Co. was established by a Mr. Singleton, in 1833. Horace T. Potts & Co. was founded by William L. Potts in 1815, and was conducted under his name until 1844, when it became Wm. L. Potts & Son. The firm name became Thomas I. Potts in 1854, and Horace T. Potts in 1866. The latter incorporated the business in 1883 under its present title.

The output of the Nova Scotia Steel & Coal Co. for November in tons is as follows: Coal mined, 76,874; ore mined, 58,752; pig iron, 7,600; steel ingots, 7,400.

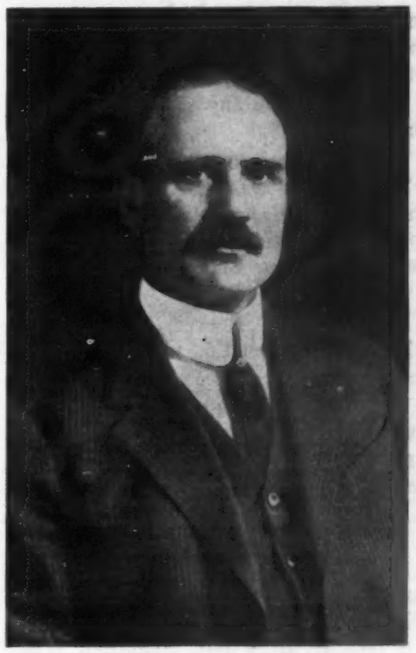
MEN OF THE IRON TRADE

C. N. Nash, the president of the General Motors Co., arose from the job of laborer at a dollar a day, to the presidency of the largest group of motor car producing companies in the world, in a period of 20 years. Since 1910 he had been the general manager of the Buick Motor Co.'s factories at Flint, Mich. Mr. Nash was born near De Kalb, Ill., Jan. 28, 1864. When he was seven, his father and mother moved to Michigan and had been in the state but a short time when the son was bound out to a farmer, Robert Lapworth, of Flushing. By the terms of the agreement, the boy was to get a suit of clothes every year, and to go to school three months in every 12. At the age of 21, he was to get two suits all at the same time, and $200 in cash. The lad stood it for four years and then ran away. He didn't like the farm. He ran all the way to Mt. Morris township and stopped long enough to learn to be a carpenter at $7 a month. About the time he had learned to drive a nail, a man offered him a dollar a month raise to work for him on the farm. He made the change and was employed there until he was 18 years old. And then came along a hay presser. It was a new thing and even then Mr. Nash was progressive. He went with the hay presser. After three years of that, he went back to farming and kept at it for seven years. He next went to the Flint Road Cart Co., at that time a small but thriving concern, and which in later years developed into the Durant-Dort Carriage Co. Mr. Nash began in the trimming department at $1 a day. It was only six months later that he was made superintendent. His was a natural gift of leadership. It is said of him that even after he had left the shops he could go out in the factory and call all of the 300 employes by their first names. As the Durant-Dort Carriage Co. grew, so also grew Mr. Nash. In the fall of 1910, he was called to the general management of the Buick Motor Co., employing 5,000 men. Under Mr. Nash's administration, the Buick company has increased its earning power with great rapidity. The General Motors business as a whole at this season of the year, shows a very material increase over the corresponding season last year. It is expected that the company will do close in the neighborhood of $80,000,000 business by Aug. 1, 1913. This is on a basis of 55,000 cars, of which the Buick company markets 30,000.

Frank R. Rhodes, of Eaton-Rhodes & Co., Cincinnati, pig iron and coke brokers, has gone to Cuba and Panama on a six weeks' vacation trip.

John Daker Jr., of Cincinnati, has been added to the sales department of Eaton-Rhodes & Co., pig iron and coke brokers, also of Cincinnati.

E. F. DuBrul, of the Miller, DuBrul & Peters Mfg. Co., Cincinnati, will sail from New York on Dec. 28, for South America, to be gone several months on a business trip.



C. N. NASH

John H. Davis, who on Dec. 1 resigned as superintendent of the steel foundry of the Otis Steel Co., Cleveland, has been presented a gold watch and chain by employes of the company.

Dr. Wilhelm Schumacher, Berlin, Germany, who has been in this country for the past six weeks in the inter of the General Briquetting Co., 25 Broad street, New York City, has returned to Germany.

George P. Spear, superintendent of the Corbin Screw Division of the American Hardware Corporation, New Britain, Conn., who has been ill for some time past, left this week for a month's sojourn in the south.

R. E. Graves, 1402 Park building, Pittsburgh, has been appointed representative of the James Clark Jr. Electric Co., Louisville, Ky., manufacturer of electric drills, electric reamers and other electrically-driven machinery.

L. H. Mesker, manager of the St. Louis branch of Manning, Maxwell & Moore, Inc., has resigned his position and will be connected in a similar capacity with the Ferro Machine & Foundry Co., Cleveland, after Jan. 1, 1913.

John G. Berquist, works manager of the Universal Portland Cement Co., has resigned that position. A connection with the company will be maintained by Mr. Berquist, who will hereafter act in the capacity of consulting engineer.

Leonard Wesson, superintendent of Plant No. 2, South Chicago, Ill., has been transferred to the general office of the Universal Portland Cement Co., to assist President Edward M. Hagar in matters relating to appropriations, construction and operation. Mr. Wesson will have the title of assistant to the president.

James V. Peterka has been appointed chief mechanical engineer of the Indiana Harbor works of the Inland Steel Co., Indiana Harbor, Ind. He will be assisted by Ole Stenbakken, construction engineer; Benjamin Burrell, master mechanic; Frank Warner, assistant master mechanic, and William Potts, shop foreman. Mr. Peterka was formerly general master mechanic of the company.

Alfred Still, the eminent English electrical engineer, who was engaged two years ago by the Lake Superior Corporation to carry out an extensive system of hydro-electric power development for the Algoma Steel Co.'s mines in the Michipicoten district, Ontario, is making an inspection of the largest water power and transmission systems in this country. He writes from San Francisco that he has been most cordially received by the managers and engineers of American plants all along the route and that every facility for observation has been afforded him.

Varied Views Expressed on Revision of the Tariff

By Prominent Manufacturers of Philadelphia—Business Conditions at Present Highly Satisfactory—Keen Interest in Legislation

Philadelphia, Dec. 9.—The subject which, more than any other, is causing serious reflection on the part of iron and steel manufacturers in this city just now is the same which is agitating the minds of leading statesmen of the country—namely, the tariff and the changes in it which will doubtless be formulated soon after the new congress meets. To determine the consensus of opinion on this matter, as well as hear their views on several other subjects, a staff representative of THE IRON TRADE REVIEW has interviewed a number of prominent manufacturers in this city.

Without exception, all of these men have very clearly defined views on the tariff. Some are in favor of a revision, while others would prefer to have the law remain as it is. All agree, however, that unwise reductions in any of the schedules, or any other foolish legislation, would have a speedy and grave effect upon our business prosperity; if the tariff is to be revised, it must be revised with great care.

President Johnson's Views

Alba B. Johnson, president of the Baldwin Locomotive Works, was the first man your representative visited. Tall, well-built and of quiet manner of speech and bearing, Mr. Johnson looks what he is, a man of large affairs. He first entered the employ of the Baldwin Locomotive Works in 1877, at the age of 19, and he has not been too busy working himself up to his present office since then, that he could not spare the time to become identified with a large number of other activities. He is a member of the American Philosophical Society, the American Academy of Political and Social Science, the Geographical Society, the New England Society, Historical Society of Pennsylvania, Sons of the Revolution, the Union League and City and Manufacturers' clubs of Philadelphia, the Railroad Club of New York, the Merion Cricket Club of Haverford, Pa., and others. He is a member of the Naval Y. M. C. A. and is interested in the work of the Presbyterian church.

"I think," said Mr. Johnson, when asked what he had to suggest in the way of proposed tariff legislation, "that a revision of the entire tariff is advisable, and this, I think, ought to be done by means of a specially appointed tariff commission in order that the revision of each separate schedule may be undertaken on the same basis of careful study and investigation. I think, also, that this revision should take place immediately, while the country is enjoying prosperity, instead of delaying it until we have another dull period."

Mr. Johnson was asked how business is with the Baldwin Locomotive Works at present.

"Very good," said he. "We are operating to 100 per cent of capacity. Business for us has picked up remarkably since June, due to the impetus furnished by the necessity of moving the large crops."

"Do you have any trouble in securing workmen?"

"No, we have been able to get all the men we want. At present, we have 18,400 men engaged at our plants in Philadelphia and Eddystone, and 3,000 at our Standard Steel works plant in Mifflin county."

When David Reeves, president of the Phoenix Iron Co., was questioned, he said:

"I am afraid that something foolish will be done with the tariff at Washington, something more foolish than was attempted recently."

"Meaning the Underwood bill?"

"Yes," said Mr. Reeves.

"As far as the articles in our line are concerned," continued Mr. Reeves, "I am in favor of no revision at all. In fact, most of our industries have been built up by means of the protective tariff and everyone, whether he consciously knows it or not, benefits by the protective policy. If this policy be abandoned, it will necessarily bring about a reduction in the present high scale of wages, as well as work harm in other directions.

"Business is good," said Mr. Reeves in reply to another question, "but a feeling of uncertainty seems to have gathered since the election. People I have talked with lately seem inclined to proceed cautiously."

Stanley G. Flagg Jr., of Stanley G. Flagg & Co., preferred not to say anything about the tariff, but he did say something about business conditions.

"For three days after the election," said Mr. Flagg, "we didn't book anything to speak of. Business improved after that, however, but is rather quiet at present. The worst feature at present is the labor problem. Labor conditions are very bad. We could use from 100 to 200 more men right now, if we could get them. We have 800 men on our books at present, although we have carried as high as 1,200."

Underwood Bill Dissected

Charles W. Asbury, president of the Enterprise Mfg. Co., manufacturer of hardware specialties, has taken particular pains to inform himself on all matters relating to the tariff. He believes there is a possibility of some foolish legislation on the tariff now that the Democrats have secured control of the government.

"My opinion of Governor Wilson," said Mr. Asbury, "is that he is a well-balanced, conservative man. It is possible, however, that some of the leaders in his party will force things in much the same manner that they did in Cleveland's administration.

"It will indeed be a mistake if they revise the tariff along the lines of the Underwood bill. In one part of this bill, it was proposed to reduce the tariff on machinery from 45 to 25 per cent. Another section provided that any iron or steel, which had been machined, chiseled or otherwise improved from the raw state, might be admitted on payment of a duty of 10 per cent. The latter I called the 'damphool paragraph,' since, by it, there was nothing to prevent foreigners from bringing machine parts in at the 10 per cent tariff and then assembling them in this country, thus avoiding the higher duty.

"I also objected," continued Mr. Asbury, "to the blanket paragraph under which, after the regular iron and steel products had been taken care of individually, all the remaining iron and steel products were grouped, at the same rate of duty, without regard to their nature or the conditions surrounding their manufacture. Fully 75 per cent of the articles in an ordinary hardware store would thus come under this blanket paragraph. Of course, I know that it would be utterly impossible for congress, or a special commission, to fix a fair rate of duty on each and every one of the thous-

ands of articles included under this paragraph. Even if this could be brought about, it would take so much time to study each one of these articles, that by the time the work was concluded the results would be useless owing to the changes in conditions in the meantime.

"No matter how the tariff is revised in other directions, however," said Mr. Asbury, "I believe that some provision ought to be made for the proper protection of articles whose manufacture I would class as 'infant industries.' By this I mean the articles which have just been developed or invented and which have not previously been manufactured. A great many articles of this kind, especially in the hardware line, are constantly being put on the market. Under the Underwood bill, such articles would have been included under the blanket paragraph.

"The thing of most importance, in a revision of the tariff, I think, is to leave the duty on each class of goods high enough at least to allow for the difference in the cost of labor in this country and abroad."

Mr. Asbury stated that his company could use more men if it were able to get the right kind. The Enterprise Mfg. Co. now has about 1,000 men on its pay-roll.

"Conditions today are peculiar," said Mr. Asbury in reference to the labor situation. "While workmen today are of a higher type, they do not seem to have the same kind of a spirit that they had 25 years ago. They were more thrifty then and did not have so many outside interests as they do today."

The Enterprise Mfg. Co. markets about 25 per cent of its products abroad.

"Our business now," said Mr. Asbury, "is greater in volume than it has been in years."

He is Not Afraid

Holstein De Haven Bright, president of the Southwark Foundry & Machine Co., does not expect any business depression as a result of anything which the Democrats may do to the tariff.

"I do not believe the Democrats will do anything foolish," said Mr. Bright. "I think they realize well enough that the harm which would be bound to follow improper tariff revision would result in preventing the party from ever again securing control of the government. The first result from any careless downward revision would be seen in lower wages which employers would be forced to pay their workmen. I think, however, that there are too many men with brains down in Washington to allow a few radicals to run away with things."

Revenue Tariff—For Some

Walter Wood, president of R. D. Wood & Co., manufacturers of cast iron pipe and other products, was asked two questions by the representative of THE IRON TRADE REVIEW. One related to the possibility of American manufacturers selling more pipe in Cuba, and the other was a request for Mr. Wood's views on tariff revision. Mr. Wood dictated the following statement:

"American manufacturers of cast iron pipe would have a better opportunity of exporting pipe into Cuba if the tariff law provided for a 'substitution' instead of an 'identification' drawback. As it is, the foundries in Luxemburg have heretofore largely secured this business.

"As to the tariff on the grosser steel products, if there is to be a revenue tariff on these products it will be sufficient to afford all necessary protection. As to grosser cast iron products, a duty of approximately 15 per cent on the value of the imported articles, *based upon their value* at the *place of importation*, will be needed."

J. J. Mohr, of J. J. Mohr & Son, dealers in pig iron, had the following to say:

"I never saw a presidential election year in which business held up so remarkably as it has this year. I think that Wilson's election had a slightly depressing effect. But, on the other hand, business had acquired such momentum before the election that if Taft had been successful, the times would probably be 'too good' by now."

Thomas Devlin, president of the Thos. Devlin Mfg. Co., manufacturer of hardware specialties and malleable iron castings, was asked what he would like to see in the way of revision to the tariff.

"We don't want any tariff at all in our line," said Mr. Devlin. "We can get along very well without any protection. In fact, as far as we are concerned, it would also be better for us if there were no duty on pig iron, as we could then get our iron cheaper.

"Of course, we would not want to benefit in this matter at the expense of others, however. That's one thing the revisionists should keep in mind—to permit no one industry to profit at the expense of another. I also believe in protection for the industries that need it, such as the woolen industry.

"I hope that any revision will be made very carefully. While reductions would not directly affect our business, foolish changes in any of the schedules will bring about a reaction in all lines.

"Business with us," said Mr. Devlin, in reply to another question, "is as good now as is possible for it to be."

Mr. Devlin is very much interested in the deep waterway movement which has been supported for years by manufacturers throughout the country, and he attended the recent Deep Waterways convention in Washington. He believes the carrying out of this project on an extensive scale would be of great benefit to the entire country by bringing about new routes and lower freight rates.

"In Philadelphia," said Mr. Devlin, "we would be able to load a shipment aboard a boat in the morning and have it arrive in New York the same day."

SECOND FURNACE

Completed and Blown In at Worth Plant—Other Improvements.

Finishing touches have been put upon the new No. 2 blast furnace of the Worth Bros. Co., Coatesville, Pa., and the new stack was blown in Dec. 4. The furnace is 85 feet in height, 21 feet at the bosh and 14 feet 6 inches at the hearth and when in good working order will have a capacity of 450 tons a day. The company also has completed or has in progress a number of other improvements to its Brandywine mills. The foundations have been completed and the brick work has been started upon a new physical test house. Two Rust boilers are being added to the blast furnace department and the stock yards are being extended. A third gantry crane has been ordered for handling pig iron, and another ingot crane is due for delivery to the company's No. 2 steel plant. The company recently added its 10th locomotive and a number of new cars are being delivered to the works.

At the viaduct works operated by the Coatesville Rolling Mill Co., a new stock and loading house is being erected. The old loading house is being enlarged and will be turned into a cutting and inspecting department.

Molders Strike.—Because the Holbrook-Armstrong Iron Co., Racine Junction, Wis., declared for an open shop, 40 union molders recently went out on a strike. The places of most of the strikers have been filled.

IMPORTANT CHANGES

In Methods of Selling Pipe Become Effective Jan. 1.

Manufacturers of iron and steel pipe have enjoyed one of the most successful years in the history of the industry. All serviceable pipe mills have operated at maximum capacity during almost the entire 12 months,

DOUBLE EXTRA STRONG PIPE BLACK AND GALVANIZED

Size.	List price per foot.	Diameters. External.	Internal.	Thickness.	Weight per foot plain ends.
½	$.32	0.840	0.252	0.294	1.714
¾	.35	1.050	0.434	0.308	2.440
1	.37	1.315	0.599	0.358	3.659
1¼	.52½	1.660	0.896	0.382	5.214
1½	.65	1.900	1.100	0.400	6.408
2	.91	2.375	1.503	0.436	9.029
2½	1.37	2.875	1.771	0.552	13.695
3	1.86	3.500	2.300	0.600	18.583
3½	2.30	4.000	2.728	0.636	22.850
4	2.76	4.500	3.152	0.674	27.541
4½	3.26	5.000	3.580	0.710	32.530
5	3.86	5.653	4.063	0.750	38.552
6	5.32	6.625	4.897	0.864	53.160
7	6.35	7.625	5.875	0.875	63.079
8	7.25	8.625	6.875	0.875	72.424

and nearly all makers will carry heavy tonnages over Dec. 31. At the beginning of the fourth quarter, few manufacturers could accept additional pipe orders, being unable to promise delivery this year. Although both iron and steel pipe were advanced a couple of times during the year, prices have not been considered high.

By far the most important event in the pipe trade this year was the in-

EXTRA STRONG PIPE, BLACK AND GALVANIZED

Size.	List price per foot.	Diameters. External.	Internal.	Thickness.	Weight per foot. plain ends.
⅛	$.12	0.405	0.215	0.095	0.314
¼	.07½	0.540	0.302	0.119	0.535
⅜	.07½	0.675	0.423	0.126	0.738
½	.11	0.840	0.546	0.147	1.087
¾	.15	1.050	0.742	0.154	1.473
1	.22	1.315	0.957	0.179	2.171
1¼	.30	1.660	1.278	0.191	2.996
1½	.36½	1.900	1.500	0.200	3.631
2	.50½	2.375	1.939	0.218	5.022
2½	.77	2.875	2.323	0.276	7.661
3	1.03	3.500	2.900	0.300	10.252
3½	1.25	4.000	3.364	0.318	12.505
4	1.50	4.500	3.826	0.337	14.983
4½	1.80	5.000	4.290	0.355	17.611
5	2.08	5.563	4.813	0.375	20.778
6	2.86	6.625	5.761	0.432	28.573
7	3.81	7.625	6.625	0.500	38.048
8	4.34	8.625	7.625	0.500	43.388
9	4.90	9.625	8.625	0.500	48.728
10	5.48	10.750	9.750	0.500	54.735
11	6.10	11.750	10.750	0.500	60.075
12	6.55	12.750	11.750	0.500	65.415

formal announcement by the National Tube Co., on Nov. 27, that lists and classifications would be changed generally Jan. 1, 1913. Manufacturers, jobbers and the leading trade journals were advised fully of various changes at that time, but this is the first general information offered the trade.

Hereafter, leading makers of steel pipe will not manufacture what has been known as merchant-weight pipe —pipe under 6 inches in diameter, varying from 5 to 10 per cent off the official list in weight. It is obvious that the manufacture of this pipe made it possible for some mills to reap benefits. All steel pipe, after Jan. 1, 1913, will not vary more than 5 per cent from the official list in weight.

In past years, steel pipe has been made on the iron pipe weight basis. Hereafter all weights will be figured on the basis of 1 cubic inch of steel weighing 0.2833 pound; iron pipe weighs 2 per cent less. Thus it is seen that the quality of steel pipe will be greatly improved. Steel pipe is sold at 10c per pound.

New discounts, presented in this issue, are based on the classification of Jan. 1, 1913, and show some increases and some decreases in cost. An accompanying table, which shows the exact difference in weights and prices, to jobbers, indicates that smaller sizes

FULL STANDARD WEIGHT JOBBERS' CAR LOADS

Size.	Black.	Galv.
⅛, ¼ and ⅜ inch, butt	73	52½
½ inch, butt	77	66½
¾ to 3 inch, butt	80	71½
2 inch, lap	77	68½
2½ to 6 inch, lap	79	70½
7 to 12 inch, lap	76	65½
13 to 15 inch, lap	53	....
Plugged and Reamed.		
1 to 3 inch, butt	78	69½
2 inch, lap	75	66½
2½ to 4 inch, lap	77	68½
Extra Strong Plain Ends, Card Weight.		
⅛, ¼, ⅜ inch, butt	68	57½
½ inch, butt	73	66½
¾ to 1½ inch, butt	77	70½
2 to 3 inch, butt	78	71½
2 inch, lap	74	65½
2½ to 4 inch, lap	76	67½
4½ to 6 inch, lap	75	66½
7 to 8 inch, lap	68	57½
9 to 12 inch, lap	63	52½
Double Extra Strong Plain Ends, Card Weight.		
½ inch, butt	63	56½
¾ to 1½ inch, butt	66	59½
2 to 2½ inch, butt	68	61½
2 inch, lap	64	57½
2½ to 4 inch lap	66	59½
4½ to 6 inch, lap	65	58½
7 to 8 inch, lap	58	47½

will continue to sell at practically the same discounts formerly offered on merchant-weight pipe. On sizes from ⅛-inch to and including 15-inch steel pipe, decreases are noted on the following sizes: 3½-inch, 4½-inch, 13-inch, 14-inch and 15-inch. One-eighth-inch, ½-inch, ¾-inch, 8-inch, 10-inch first and second sizes, and first 12-inch remain unchanged, and the other 17 sizes are increased. Increases are slight, however, as it must be remembered that the standard of weights has been changed in favor of the buyer.

In the future, galvanized pipe will weigh practically the same as black pipe; manufacturers will make skelp a little lighter for galvanized than for black pipe, so that the finished galvanized product will cost no more per foot for freight than black pipe, which will mean a small saving to the consumer.

Independent manufacturers of steel pipe signified intentions of adopting the new classifications and discounts upon receipt of advice from the leading interest, Nov. 27. Announcement at that time made it possible for all mills to discontinue taking further orders for merchant-weight pipe, and jobbers were given sufficient opportunity to dispose of what off-weight pipe they were carrying in stock.

Manufacturers of iron pipe advise that they will discontinue offering merchant-weight material. At the time of going to press, no change in iron pipe discounts was being considered.

The accompanying table, showing comparisons between the old and new classifications, applies to standard steam, gas and water pipe, either black or galvanized. Extra strong and double extra strong black and galvanized pipe are not included in comparisons. Suffice it to say that similar differences are noted on the

FULL STANDARD WEIGHT, BLACK AND GALVANIZED

Size.	List price per foot.	Diameters. External.	Internal.	Thickness.	Weight per foot. Plain ends.	Threads and couplings.	Threads per inch.
⅛	$.05½	0.405	0.269	0.068	0.244	0.245	27
¼	.06	0.540	0.364	0.088	0.424	0.425	18
⅜	.06	0.675	0.493	0.091	0.567	0.568	18
½	.08½	0.840	0.622	0.109	0.850	0.852	14
¾	.11½	1.050	0.824	0.113	1.130	1.134	14
1	.17	1.315	1.049	0.133	1.678	1.684	11½
1¼	.23	1.660	1.380	0.140	2.272	2.281	11½
1½	.27½	1.900	1.610	0.145	2.717	2.731	11½
2	.37	2.375	2.067	0.154	3.652	3.678	11½
2½	.58½	2.875	2.469	0.203	5.793	5.819	8
3	.76½	3.500	3.068	0.216	7.575	7.616	8
3½	.92	4.000	3.548	0.226	9.109	9.202	8
4	1.09	4.500	4.026	0.237	10.790	10.889	8
4½	1.27	5.000	4.506	0.247	12.538	12.642	8
5	1.45	5.563	5.047	0.258	14.617	14.810	8
6	1.92	6.625	6.065	0.280	18.974	19.185	8
7	2.38	7.625	7.023	0.301	23.544	23.769	8
8	2.50	8.625	8.071	0.277	24.696	25.000	8
8	2.88	8.625	7.981	0.322	28.554	28.809	8
9	3.45	9.625	8.941	0.342	33.907	34.188	8
10	3.20	10.750	10.192	0.279	31.201	32.000	8
10	3.50	10.750	10.136	0.307	34.240	35.000	8
10	4.12	10.750	10.020	0.365	40.483	41.132	8
11	4.63	11.750	11.000	0.375	45.557	46.247	8
12	4.50	12.750	12.000	0.330	43.773	45.000	8
12	5.07	12.750	12.000	0.375	49.562	50.706	8
13	5.60	14.000	13.250	0.375	54.568	55.824	8
14	6.10	15.000	14.250	0.375	58.573	60.375	8
15	6.50	16.000	15.250	0.375	62.579	64.500	8

various sizes classified under these heads.

New discounts on steel boiler tubes are identical with those in effect the latter part of 1912.

OIL ENGINE

Was Subject of a Paper at Philadelphia Foundrymen's Meeting.

With about 75 members in attendance, the Philadelphia Foundrymen's Association held its two hundred and twenty-third meeting at the Hotel Walton, Philadelphia, Wednesday night, Dec. 4. As President Thomas Devlin was in Washington, the meeting was opened by Josiah Thompson, and later presided over by Dr. E. E. Brown. The most important action taken was the re-election of all of the old officers to serve for another year.

William T. Price, of the De Lavergne Machine Co., New York, delivered a very interesting lecture on "The Oil Engine". Mr. Price's speech was entirely extemporaneous, as he had prepared no written paper. Its delivery was accompanied by the exhibition of a number of slides which were projected on the screen. Mr. Price explained in detail the methods of designing and operating the various types of gasoline, gas, distillate and oil engines on the market; he also gave some interesting data in connection with the cost of operating a shop by different means of motive power, showing oil engines to be the most economical. He said that an oil engine, as built at present, should have a life of at least 20 years, and that it might then be rebuilt at comparatively small cost. The life of an oil engine, he said, should be as long, if not longer, than that of a gas engine, since oil does not corrode the engine.

The officers of the Philadelphia Foundrymen's Association are: President, Thomas Devlin, of the Thomas Devlin Mfg. Co.; vice president, Dr. E. E. Brown, of E. E. Brown & Co.; treasurer, Josiah Thompson, of J. Thompson & Co.; secretary, Howard Evans, of the J. W. Paxson Co.; executive committee, Walter Wood, of R. D. Wood & Co.; Thomas M. Eynon, of the Eynon-Evans Mfg. Co.; H. L. Haldeman, of the Pulaski Iron Co.; Walter T. Macdonald, of the Schaum & Uhlinger Co., and Walter S. Bickley, of the Penn Steel Casting & Machine Co., Chester. The trustees are Thomas Devlin, Josiah Thompson and Howard Evans. The official chemist is George C. Davis, 39 South Tenth street, Philadelphia.

Ready for Inspection.—Mackintosh, Hemphill & Co., Pittsburgh, announce that they will have ready for inspection at their works, Eighteenth and Etna streets, that city, on Dec. 14, 16 and 17, a 44-inch and 70 x 60-inch twin, tandem, direct connected reversing engine, just completed for shipment to the Pittsburgh Crucible Steel Co.'s plant at Midland, Pa. This engine is practically identical with the one at the Duquesne plant of the Carnegie Steel Co. and the Aliquippa plant, of the Jones & Laughlin Steel Co., both of which were built by Mackintosh, Hemphill & Co. These engines were described in full, with complete drawings and photographs, in the May 7, 1906, issue of THE IRON TRADE REVIEW.

COMPARISON OF PRICES AND WEIGHTS OF BLACK AND GALVANIZED STEEL PIPE FROM ⅛-INCH TO AND INCLUDING 15-INCH UNDER CLASSIFICATIONS OF JAN. 1, 1910, AND JAN. 1, 1913

Size.	List price per foot old card.	List price per foot new card.	Weight per foot old card.	Weight per foot new card.	Difference in price.	Difference in weight.
⅛	$.05½	$.05½	0.24	0.245	.....	0.005
¼	.05½	.06	0.42	0.425	0.005	0.005
⅜	.05½	.06	0.56	0.568	0.005	0.008
½	.08½	.08½	0.84	0.852	.....	0.012
¾	.11½	.11½	1.12	1.134	.....	0.014
1	.16½	.17	1.67	1.684	0.005	0.014
1¼	.22½	.23	2.24	2.281	0.005	0.041
1½	.27	.27½	2.68	2.731	0.005	0.051
2	.36	.37	3.61	3.678	0.001	0.068
2½	.57½	.58½	5.74	5.819	0.01	0.079
3	.75½	.76½	7.54	7.616	0.01	0.076
3½	.95	.92	9.00	9.202	0.03	0.202
4	1.08	1.09	10.66	10.889	0.01	0.229
4½	1.30	1.27	12.49	12.642	0.03	0.152
5	1.45	1.48	14.50	14.810	0.03	0.310
6	1.88	1.92	18.76	19.185	0.04	0.485
7	2.35	2.38	23.27	23.769	0.03	0.499
8	2.50	2.50	25.00	25.000	....	.....
8	2.82	2.88	28.18	28.809	0.06	0.729
9	3.40	3.45	33.73	34.188	0.05	0.488
10	3.20	3.20	32.00	32.00	....	.....
10	3.50	3.50	35.00	35.00	....	.....
10	4.00	4.12	40.00	41.132	0.12	1.132
11	4.50	4.63	45.00	46.247	0.13	1.247
12	4.50	4.50	45.00	45.00	....	.....
12	4.90	5.07	49.00	50.706	0.17	1.706
13	5.75	5.60	56.10	55.824	0.15	0.276
14	6.50	6.10	60.70	60.375	0.40	0.325
15	7.00	6.50	64.90	64.500	0.50	0.400

In comparing costs and weights it must be remembered that under old card steel pipe was made on iron pipe weights. Under new card all weights are figured on the basis of 1 cubic inch of steel weighing 0.2833 pounds. Iron pipe weighs 2 per cent less.

ORE SHIPMENTS

Showed Increase Over Last Year of 15,300,000 Tons.

Complete ore shipments are now in showing that the fleet moved 4,072,674 tons during November. During December 14,579 tons were shipped, making the total movement for the season 47,435,777 tons, an increase of 15,305,366 tons over 1911 shipments.

Shipments by ports during November and December were as follows:

Port.	Nov., 1911.	Nov., 1912.
Escabana	513,790	560,328
Marquette	244,135	214,431
Ashland	168,909	414,224
Superior	605 531	1,140,767
Duluth	476 563	1,080,066
Two Harbors	514,325	662,858
	2,523,253	4,072,674
1912 increase		1,549,421

Port.	Dec., 1911.	Dec., 1912.
Escanaba	.....	10,428
Two Harbors	.....	4,151
	.....	14,579

Shipments by ports during 1911 and 1912 were as follows:

Port.	Season 1911.	Season 1912.
Escanaba	4,278,445	5.234.655
Marquette	2,200,380	3,296.761
Ashland	2,429,290	4,797,101
Superior	9,920,490	14,240,714
Duluth	6,934 269	10,495 577
Two Harbors	6,367,537	9,370,969
	32,130,411	47,435,777
1912 increase		15,305,366

Receipts at Lake Erie ports in November and December were 3,811,530 tons, distributed as follows:

Port.	Nov., 1912. Gross tons.
Buffalo	630,011
Erie	103,429
Conneaut	574,056
Ashtabula	799,848
Fairport	138,957
Cleveland	800.022
Lorain	263,054
Huron	58,215
Sandusky	.....
Toledo	242,167
Detroit	67.441
Total	3,677,200

Port.	Dec., 1912. Gross tons.
Buffalo	20,486
Cleveland	79,926
Ashtabula	22,829
Toledo	6,455
Lorain	4,634
Total	134,330

Laid Up at Toledo.—Several bulk freighters are now sheltered in the harbor at Bay View Park, Toledo, O., being the first season these boats have ever wintered here. Repairs will be made by the Toledo Ship Building Co.

BRITISH AND CONTINENTAL MARKETS

BRITISH IRON TRADE

London, Dec. 10. (By cable.)—Cleveland warrants, 67s 7½d, an increase of 6d since yesterday.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Nov. 30.

Pig Iron.—The pig iron market has been favorably affected by the somewhat brighter outlook in east Europe. The nervousness of speculators is shown, however, by the drop of a few pence, early in the week, on the news of unfriendliness between Austria and Russia. But the irresistible fact of pig iron scarcity is dominating the market, and has been responsible for decided improvement in price. The Birmingham district furnishes a much truer index of the position, and at Thursday's meeting there was a rise of from 1 shilling to 3 shillings, according to the urgency of the need. Northampton and Derbyshire pig irons were all a shilling higher, while Nottingham iron had advanced half a crown. Consumers have grown quite tired of their futile efforts to depress prices, and are eager to secure themselves for the early months of the year. It is notorious that consumers all over the Midlands are running out their small reserves, and that in some cases production is being restricted for want of material. In the Cleveland district, there is a net rise of about 6 pence on the week. The price for No. 3 is 67s 9d ($16.54), with 68s 8d ($16.76) three months, and the stocks now stand at 250,000 tons. In that market, consumers have been almost tumbling over each other to get their orders placed before the further expected rise. A heavy volume of forward business is being done on the high basis of 68s 9d ($16.78). Fortunately, for the consumer, this is the quiet period for shipping and the total shipments for the month will be not more than 70,000 tons. The great scarcity of coke continues to be a strengthening element in the market. In the hematite department there is even greater confidence and this week a number of important contracts have been placed by Sheffield steel makers, covering their requirements for most of next year. The price at the furnaces is 82s ($20.08) to 82s 6d ($20.14), but a good deal of foreign business has been done at an addition of 3 pence to these figures.

Finished Iron and Steel.—All departments of the finished iron and steel trade, with the possible exception of galvanized sheets, show increased strength. In the steel section, the recent advance of 5s has taken effect, but has caused no falling off in the demand, which is very heavy for all kinds of constructive work. After remaining comparatively quiet for some weeks, raw steel has advanced, makers easily obtaining £6 per ton, for material recently sold at £5 17s 6d. Apparently, foreign supplies of material, coming to this country by way of Newport, have ceased altogether. This has diverted a great amount to the British mills, which have great difficulty in satisfying their customers. A number of mills using billets have been compelled to reduce their output, through scarcity of material. This is especially the case with wire mills, makers being unable to get their wire rods. Trade has been completely disorganized by the interruption of the German supply of material, and this condition has been aggravated by transit difficulties in Germany, attributed to the influence of the war. In Sheffield, a large number of new contracts have been placed this week by buyers from practically all parts of the world. One firm has received orders from the London county council for 10,000 tires for tramways. Very substantial orders have been placed for railway axles and springs. In the meantime, all the railways are pressing for delivery, while the impossibility of getting tramway material has compelled some of the authorities to postpone their enterprises until next year.

FRENCH IRON TRADE

Paris, Nov. 21.

A good deal of discussion has taken place here recently with regard to iron ore prospects, but it is generally held that for a lengthy period there need be no apprehension of an iron ore famine though the increasing demand has had the effect of enhancing prices, which in the future will probably be more accentuated. In face of the coming rise in value of iron and coke, it will perhaps be found requisite to concentrate the poorer ores and briquette them, so as to supply a rich ore demanding less fuel for reduction. In all countries, the selling price of iron ores has been augmenting; those of Brieq, in France, which originally sold at 3 and 7 pence (85c) per ton now realize 5 shillings and 3 pence ($1.34). The most striking illustration is that of Bilbao, Spain, where the price in 1887 was 7 shillings ($1.70) and in 1910 was 15s ($3.64), showing that the value had doubled in 20 years. It seems, therefore, manifest that a brilliant future lies before the iron ore trade, because the enormous quantities that will be needed to satisfy the sharply growing demand will assure remunerative prices.

The tone in France on metallurgy is entirely satisfactory. Great activity prevails in all departments of the iron works and machine shops, both of which are surcharged with work. They appear quite unconscious of the fact that the political situation is a threatening one. Coal shares in the general prosperity, of course.

BELGIAN IRON TRADE

Brussels, Nov. 21.

Although the Belgian iron market is necessarily affected in consequence of the large export trade, there is no falling off in the great activity at the foundries. Production is for the most part guaranteed up to the end of March, and orders are now coming in for the second quarter of 1913. Prices, too, are generally firmer, in spite of the stoppage of orders from the Balkan countries. On the other hand, iron and steel and coal securities have considerably depreciated in value. Pig iron continues scarce. Under the influence of the higher prices for German pig iron and of the decision on the part of the Longwy pig iron selling bureau to increase prices, there is a strong upward tendency in the Belgian pig iron market.

Bar iron for export is again 1 shilling (25 cents) to 2 shillings (50 cents) easier, steel bars now being quoted £6 4s ($30.20) to £6 6s

BRITISH AND CONTINENTAL MARKETS

($30.65) and iron bars £6 1s ($29.45) to £6 2s 6d ($29.81). Also the sheet market is 1s (25 cents) weaker at £7 1s ($34.32) to £7 3s ($34.79) for sheets of 1/16 inch. Other departments have successfully withstood any attempt made to obtain concessions from manufacturers, but there is a general tendency to keep orders back wherever possible. For the time being, the mills are too busy to pay much heed to this, since they have sufficient work for a considerable time to come.

Considerable activity has been displayed in the Belgian iron districts and many new blast furnaces are under construction. Operations have been commenced with new furnaces at Seraing by one company and at Chatelineau, near Charleroi, by another. Other companies have started respectively for third and fifth blast furnaces. The Sambre et Moselle Co. is actively engaged in constructing a third blast furnace at its Montigny works, near Charleroi, together with a coke oven plant of 70 units and it recently resolved to take in hand the construction of a fourth blast furnace and a new coke oven plant. The Cockerill company lately started operations with a second forging press of 2,000 tons at its Seraing works, where the erection of a large gasholder of 50,000 cubic millimeters capacity to regulate the output of gas received from the coke ovens has been decided upon, and also a new large foundry which is estimated to take two to three years for its completion.

Active progress is being made with the large extensions decided upon by the Athus Grivegnee Co. (Belgian Luxemburg district), which includes the construction of a third blast furnace with a daily output of 160 tons, the reconstruction of the existing furnaces to utilize the waste gas for driving the air-blast machinery or working dynamos and the construction of a modern steel works and of a rolling mill for half-finished products, rails and joists. These changes are expected to be complete in April next. At Grivegnee (near Liege) the same company is improving its rolling mill plant and its open-hearth plant by the addition of a fourth unit.

In the district between Ghent and Terneuzen along the canal connecting those two places, there is a proposal to erect a plant of blast furnaces for producing hematite pig iron, and progress is being made with the works under erection at Sluiskill (Holland) on the above canal for the supply of coke to a number of French firms in the Longwy district.

GERMAN IRON TRADE

Berlin, Nov. 21.

As it was generally expected that the firm of Friedr. Krupp, Essen, would celebrate its centenary by the declaration of a record dividend, the recent declaration of 12 per cent against 10 per cent last year, came as no surprise. The actual profits disclosed were 33,759,461 marks ($7,938,473.33) against 28,876,193 marks ($6,835,905.35) last year, though the increase was almost entirely due to the larger amount brought forward, 4,230,580 marks ($994,186.30), against 163,928 marks ($38,523.08).

The iron market in Germany is firm with prices unchanged for the week. Fresh business is not offering much at present, but the mills will be working at full pressure for a long time to come. Pig iron is scarce owing to insufficient railway transport opportunities. Fuel also is in insufficient supply and many furnaces have had to be damped down as a consequence, whilst others have reduced working.

Since the sale of pig iron for the first half of 1913 has been opened, consumers have eagerly covered their prospective requirements. Calls continue most urgent, but makers refuse supplementary orders for current requirements. The prices of half-finished products for the first quarter of next year are to be fixed at the next meeting of the syndicate, having been postponed owing to the political uncertainty. The export trade is somewhat quieter, but on the whole demand is still active. The deliveries of the syndicate in October totalled 540,600 tons, against 510,000 tons in September and 472,100 tons in October, 1911. Bar iron has been relatively more affected by political events and forward business is quiet, but, as most of the mills are in arrears with delivery they welcome an opportunity to get more up to date again. Prompt supplies still command appreciable premiums and business in girders, despite the advanced season, is fairly active. Plate mills are very busy and have occasionally to refuse orders; the ship building trade continues taking large quantities. Sheets are a quieter market, and some orders have been accepted at rather lower rates. Hoop iron is doing very well. Pipe works are sold out for many months to come. Drawn wire is in fair demand, especially fine sorts. Rolled wire mills are heavily engaged, but wire products are quieter, and there are complaints of unremunerative prices. The rolling stock mills have received a further order for 3,000 railway trucks for the State railway at prices about 3 per cent higher than those for the last year's contract.

RUSSIAN IRON TRADE

St. Petersburg, Nov. 20.

The progress of iron ore production in Russia has been very considerable this year and figures published referring to special production in the first six months in the Donets basin show a total of 176,570,000 poods (2,848,000 tons), which is an increase on the production of iron ore in the corresponding period of 1911, amounting to 32,760,000 poods (528,400 tons), or 22.78 per cent. The Krivoirog Works account for 163,570,000 poods (2,634,000 tons) of the foregoing this year, and the Kerchensk Works for 13,000,000 poods (209,000 tons), and practically the whole quantity produced had been either exported or sent to the smelting works in Russia within the period named. The quantity exported abroad, however, amounted only to 21,711,350 poods (350,170 tons), showing a considerable diminution on the exportation of the previous year for this class of goods. The iron works took delivery of quantities exceeding those of the preceding year by 23.42 per cent. The result, of course, has been a well-maintained market for iron ore in South Russia. Accompanying this extra production of iron, there is a scarcity of coal, notwithstanding that it, too, is being produced in larger quantities than before.

MINING NEWS FROM THE IRON RANGES

Extensive Work at Michigan Mines

The Breitung interests, with producing properties at Negaunee and Humboldt, Mich., are working their Marquette range mines vigorously this winter. A new shaft at the Breitung Hematite mine, at Negaunee, will be started soon, drilling to determine the location having been in progress for about a year. The shaft will be south of the present one and eventually will be 2,000 feet deep. The Jones & Laughlin company's recently-completed shaft at the Rolling Mill mine, at Negaunee, has been provided with a new Sullivan hoist and the shaft is to be used exclusively for the hoisting of men and material, all the ore to come through the old shaft.

The Cleveland-Cliffs company, which is gradually electrifying its Marquette range mines, is installing an underground power haulage plant at its Cliffs shaft, at Ishpeming. This is a hard ore mine and the openings have been extended a long distance from the shafts. The tramming distances have become too great for manual power, and the electric haulage system will both cheapen and facilitate handling the ore from the stopes to the shafts. With the surrender of the Ashland mine, at Ironwood, Gogebic range, to the fee owners, E. A. and J. O. Hayes, of California, the Cleveland-Cliffs company is now producing ore only on the Marquette range and at the Crosby mine, on the Mesabi range. The Ashland had been operated on a lease taken in 1901. It is reported that the property has reverted to the owners for the reason that costs were too high under existing terms and that concessions were refused. The Hayes brothers will operate the mine on their own account for the present. The Cleveland-Cliffs company has taken out a larger tonnage of ore than was thought possible 10 years ago, and exploration for new ore bodies will probably be costly and difficult. The company opened the mine, explored extensively with the diamond drill and installed equipment, and the property has been left in excellent condition.

The past shipping season in the Crystal Falls district of the Menominee range has been notable in that it has seen a removal of ore that had gradually been accumulating for years. This especially has been the case at Corrigan, McKinney & Co.'s Dunn, Tobin and Armenia mines. Oglebay, Norton & Co. have remaining in stock at their Bristol property only a small amount of low-grade ore, and the Ravenna and MacDonald mines were new but small shippers. New producers next season will be M. A. Hanna & Co.'s Carpenter and the Roberts Ore Co.'s Hilltop mines. All of the Crystal Falls operating mines are preparing to make large shipments and all will be worked briskly through the winter. The McGreevy Steel Co. has started shaft-sinking at the Purcell property, and Corrigan, McKinney & Co. are pushing operations at the Tully tract, where a large ore body has been shown by drilling and where the work of opening a mine has been started. At its American mine, Marquette range, the M. A. Hanna company is completing the construction of a club house, 50 x 30 feet, two stories high, for the use of its employes.

Labor Shortage Becoming Acute

The shortage of labor in the Lake Superior region is becoming more pronounced, skilled miners and trammers having never been in more eager demand than at present. The force at the Cleveland Lake mine, at Ishpeming, which for the last two years has been worked on single shift, is being increased from 250 to 500 men as rapidly as possible, and both the Negaunee and Maas mines, at Negaunee, are in need of additional men. While the Negaunee has 425 names on the payroll at present, it is hoped the number can be increased to 600 by Jan. 1. It is planned to double the force at the Maas mine during the winter, 175 men now being employed there, and production also is being increased by the Cleveland-Cliffs company in the Swanzy district. The Volunteer Iron Co. could use more men at its mine in the Cascade district and in the Diorite district, west of Ishpeming. M. A. Hanna & Co. are steadily enlarging their operations at the American mine and adjoining Maas lands.

Good Record on the Vermilion

Although shipments from the Vermillion range are remarkably steady, even in dull seasons, the shipments during the season closed recently were greater than for several years. In fact, the best previous records are said to have been exceeded by about 70 per cent. A large percentage of this increase has come from stockpiles, and not from any particular increase in mining activity. As a consequence, the quantity in stock at the mines at the close of navigation was much less than usual, and this seems to indicate a greater amount of actual mining next season, if the record is to be approached or exceeded. At the close of the season, the Oliver Iron Mining Co.'s stockpiles on this range contained about 120,000 tons, approximately 25 per cent of the amount at the same time last year.

Cuyuna Range is Busy

Operations at all points on the Cuyuna range are being actively pushed, and the winter promises to be a busy one. Exploratory work is especially active, the operating mines are stockpiling and the range is fast assuming a position of importance. At the Barrows mine, in the vicinity of Brainerd, work is requiring additional labor, and miners are coming there from the Mesabi. Among the independent companies that are working steadily are the Iron Mountain Mining Co., north of Crosby; Cuyuna-Mille Lacs Co.; Cuyuna-Duluth Mining Co., and others. Some are confining their work to drilling and other exploratory operations, either doing it themselves or contracting it to some of the well-known drilling companies.

The Breitung - Kaufman mines in the Negaunee district, Marquette range, were inspected recently by E. N. Breitung, general manager, and H. L. Kaufman, assistant general manager. The party also included W. B. Pattison, general superintendent, Samuel Jewell, assistant general superintendent, and W. B. Goodman, underground superintendent. The trip consisted of both surface and underground inspection of mines.

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In the New York machinery market, December opened with signs that satisfactory machinery business will continue. General buying of plant equipment for extensions, as well as renewals, compares favorably with pre-election conditions. Favoring weather has prolonged construction activity and has imparted unusual life to trade in contractors' supplies for this season. During the past week, plans have been announced for several industrial plants that will be established in that territory. It is reported that the Norfolk & Western railroad will close shortly for the list of machine tools, on which bids were asked in October. Sellers in the New York trade are also advised that the Western Maryland railroad will distribute specifications for considerable shop equipment within a short time. The Wisconsin Central railroad recently purchased a small lot of lathes, drills and other machine shop equipment. New York dealers have received orders, through Philadelphia representatives, for a number of tools, bought by the Bethlehem Steel Co. Specifications for about $20,000 worth of machine tools have been received from the Pennsylvania railroad. The large lists of the Boston & Maine and Baltimore & Ohio railroads, which have been expected for some time, have not yet appeared, but it is known that the former at least is fully prepared for sending to dealers and may be received at any time.

In Pittsburgh, a number of machine tool builders advise that the market is experiencing the usual year-end lull, and expression often is heard, that the buying movement will not begin again until after appropriations for 1913 have been allowed. The large number of orders for miscellaneous tools, taken by agents in that district, however, indicate that a fairly good volume of business continues to be enjoyed. Builders of electric cranes, especially, are enjoying an excellent season and approximately three dozen cranes of various capacities, are involved in pending inquiries. Demand for machine tools from foreign users has been good. The Mesta Machine Co. advises that it has taken an order for a large roll lathe for shipment to Italy, and the Mesta company has been selling tools and engines to Canadian interests. The Pennsylvania railroad has been quietly closing its list, one of the largest issued for some time, and has already placed orders for wood-working tools, at least a half dozen shears and punches and a number of grade planes, for shops in the western division. The unusually healthy condition of the iron and steel trade is beginning to have a good effect on the market for machine tools, and nearly all the largest manufacturers of iron and steel products are replacing old equipment or buying new.

In Cleveland, conditions in the machine tool trade are quiet, and while a number of dealers advise that business continues satisfactory, there has been a noticeable decline from the heavy buying of a few months previous. This condition, though usually in evidence at this season, is said by some dealers to have been accentuated by the determination of some manufacturers to hold off plant additions and new construction work until the attitude of the incoming administration and the probable trend of congressional action at the special session are more fully known. Other dealers with a flood of orders in sight for single tools, are well satisfied, however, with the volume of business taken and look forward to a resumption of the heavy buying after the first of the year.

New Construction

The Burr Co., Champaign, Ill., is building a new foundry.

The Schell Foundry & Machine Co., Ltd., is planning an extension to its plant at Alexandria, Ont.

The Magog Foundry Co., Ltd., is planning a new foundry at Magog, Que.

Plans have been made by the Grand Rapids Foundry Co., Grand Rapids, Mich., to build a pattern and core room, 50 x 100 x 100 feet.

Figures have been received on a large addition to the Sanderson plant of the Crucible Steel Co. of America, at Syracuse, N. Y.

The Loose-Wiles Biscuit Co., 485 Greenwich street, New York, will establish a large factory in Long Island City. Construction work will be started at an early date on the building, which will be 10 stories and 200 x 200 feet.

The Forsyth Pulverizer Co., Ltd., recently organized, will erect a factory at Toronto, Ont., to manufacture rock crushing and mining machinery.

The Minneapolis Threshing Machine Co., Minneapolis, Minn., will build a warehouse to cost $28,000 at Regina, Sask.

The Sherwin-Williams Co., Brown street, Newark, N. J., manufacturer of paints, has filed plans for a brick factory addition to be erected at its plant.

The Ford Motor Car Co., New York, is asking bids on contract for the construction of an assembling and repair plant, to be erected on Jackson avenue, Long Island City. The building is to be five stories, 70 x 195 feet. Goldwin, Stanett & Van Vleck, architects, 45 Union Square, New York, are receiving bids.

A contract has been awarded for a $12,500 factory building for the Diamond Miller Co., Nutley, N. J. The work will be done by the Scudise Building Co., Newark, N. J.

The Mechanics Foundry & Machine Co., Fall River, Mass., will erect a machine shop, garage and office building. The machine shop will be 44 x 100 feet, the garage 50 x 60 feet, and the office building 19 x 49 feet.

The Waterville Corporation, Waterbury, Conn., has begun work on a new factory to be erected in Thomaston avenue. The building will be of brick, with steel beams and girders, 160 x 60 feet, two stories high.

Officials of the Big Four railroad visited Bellefontaine, O., last week,

and made the announcement that plans are being considered for the erection of car repair shops in that city after Jan. 1.

Plans are being perfected by M. Dunchmidt, Concord, Staten Island, N. Y., for a large garage, including a vulcanizing plant and machine shop. The building will be erected at Targee street and Clove avenue.

Bids are being received by the Central Railroad of New Jersey, 143 Liberty street, New York, for the construction of two round house buildings, one at Crawford, N. J., and one at Jersey City.

A machine shop to cost $25,000 is planned for the Thurber Syndicate, Kenora, Ont. Machines for the Thurber process of gold extraction will be manufactured and the plant will consist of a pattern, casting and machine shop.

Plans are under way for reconstructing the plant of the South Jersey Glass Works, Swedesboro, N. J., which was practically destroyed by fire Sept. 27. The new building will be of steel and concrete construction and fire-proof.

The McClintic-Marshall Construction Co., Pittsburgh, has taken a contract from the Industrial Works, Bay City, Mich., for a new machine shop, 150 x 520 feet, involving 1,400 tons. It will fabricate the steel. Work will begin next March. It is estimated the new addition will cost $500,000.

The Hart & Hutchinson Co., New Britain, Conn., manufacturer of lockers, has completed negotiations for the purchase of a 36-acre tract of land beyond Black Rock bridge, and has had plans prepared for a factory 600 x 72 feet, one story high, to be erected on the site.

The Scranton Bolt & Nut Co. plans extensive improvements to the plant at Scranton, Pa., following the issue of $250,000 of bonds. The company is to enlarge the plant with three or four additional buildings and install new machinery so as to meet the growing demand for the company's product.

The Emerson-Brantingham Co., Rockford, Ill., has asked the Harrisburg, Pa., city council for siding privileges for the erection of a large warehouse and distributing plant in that city. It is the idea to begin construction this winter if weather permits.

The Portage Boat & Engine Co., of Portage, Wis., has started work on a $10,000 addition, to be used for machine shop purposes. The building will have ground dimensions of 40 x 120 feet and will be two stories high. It will include a garage and automobile repair department.

The Koehring Machine Co., Milwaukee, manufacturer of concrete machinery, mixers, engines, etc., will build a $20,000 addition to its works at Twenty-third and Burleigh streets, Milwaukee. It will be of reinforced concrete construction. Philip Koehring, Germania building, is in charge.

The Etna Machine Co., Toledo, O., which recently moved into its new plant on the Michigan Central railroad and Maplewood avenue, has already found it necessary to expand and is building an addition to the plant which will greatly increase its output.

The Michigan Central railroad has purchased a tract of eight acres near the intersection of its tracks and the Manhattan boulevard, Toledo, O., and will construct a 20-stall roundhouse. It is the intention to erect 10 stalls now and the others in the spring, at an expenditure of $170,000.

The Epping-Carpenter Co., Pittsburgh, manufacturer of pumping machinery, will build a two story brick office building at Forty-third street and the Allegheny Valley railroad. Architect F. J. Osterling, 1707 Commonwealth building, of that city, has awarded the contract to Calhoun & Miller.

The Northwestern Malleable Iron Co., of Milwaukee, Wis., has been granted a building permit to erect an addition to its annealing department at a cost of $15,000. The addition will be of concrete and brick construction. The works are located on Park street, between Thirteenth and Eleventh streets.

The National Iron Works Co., Ltd., Toronto, has commenced work on an addition to its plant, which will be of steel and brick construction on a concrete foundation, and will give the company double its present capacity. The new building will be exclusively devoted to the manufacture of 60-inch cast iron pipe, and it will have a capacity of 175 tons per day.

Work has been started at Toledo, O., on a new $350,000 bottle manufacturing plant to be built by the Toledo Glass Co. The building of the plant and the installation of machinery will be done by the DeVore-McGormley Co. All work from the delivery of the raw materials to the packing of finished products will be performed automatically by machinery.

The Gray Iron Foundry Co., Reading, Pa., has purchased the plant of the National Brass & Iron Works, at Tulpehocken and Green streets, that city. The plant has been idle for some time. The Gray Iron company will rebuild the foundry to the capacity of 60 molders. The brass foundry will also be equipped. The cupola is nearing completion and it is expected to occupy the plant about Jan. 1.

John L. Mullen, contracting engineer, Pittsburgh, has been awarded a contract for the erection of the structural steel in the Hasley building, Atlanta, Ga. This new office building will be 100 x 200 feet and will have 16 stories above ground and two stories below. About 3,000 tons of structural steel are involved. It will be fabricated by the American Bridge Co.

Bids on revised plans for the Elizabeth Steel Magee hospital building, Pittsburgh, are being taken by Architect T. E. Bilquist, Stevenson building, that city. The building will require approximately 6,000 tons of structural steel. Estimates are being taken on three 125-horsepower return tubular boilers, two 100-kilowatt engine and generator sets and one 50-kilowatt engine and generator set for the power plant of the hospital.

The annual statement of the Independent Pneumatic Tool Co., whose board of directors held its annual meeting in Chicago on Dec. 3, shows an increase in the company's sales of 31 per cent over the previous year. In order to meet this increased demand for Thor air tools, additional factory buildings are now under construction at Aurora, Ill., which, with equipment, will cost several hundred thousand dollars.

The National Cash Register Co., Dayton, O., has prepared plans for a plant to cost $300,000 to be erected on Christie street, Toronto, next spring. It will comprise three buildings, 200, 300 and 400 feet in length, respectively, by 60 feet wide. They will be two stories, of steel and brick, with stone facings. The machinery to be installed will manufacture all parts of the registers instead of only a few portions as at present.

Included in the general announcement that the Watson-Stillman Co. will remove its main offices from 50 Church street, to the company's plant at Aldene, N. J., is the information that it will build an extension, 100 x 120 feet, to the machine shop. The addition will be used as an erecting department. The enlargement is necessitated by the increasing business, which the company is enjoying. A sales office will be retained in room 1560, 50 Church street, New York.

Five buildings will be constructed

by the Universal Wheel Co., 166-172 Madison street, Chicago, at Ft. Wayne, Ind., where the company recently purchased five acres in the center of the manufacturing district, which are served by two railroads. Plans and specifications have been issued for the buildings. The main one will be 125 x 250 feet, and will be used for machine work and as an assembling room. The four other buildings will each be 62½ x 125 feet. One will be the engine room and forge shop; one will be for the wood-working department; one will be used as a paint shop and one for storage purposes. The company invites inquiries for the heating and ventilating systems, as it will use both iron and wood-working machinery and will be in the market for that class of machinery and also for equipment for the power and electric plants. The company, at present, has a little over 4,500 feet of space in the plant at 247 Pearl street, Ft. Wayne, and will occupy this building until the new structures are completed, which is expected to be about April 1, 1913. Orders on hand will keep the company busy for eight months. The company hopes upon the completion of the new plant, that it will increase to such an extent that orders can be cared for promptly.

Power Plant Equipment

Large improvements and extensions for additional service will be constructed at Elizabethton, Tenn., by the Watauga Power Co., which has just sold $300,000 in bonds in New York. The company furnishes current to the towns of Bristol and Elizabethton, and will now transmit power to the towns of Johnson City, Jonesboro, Morristown and Greenville.

The newly-organized Kentucky Utilities Co., which has been actively engaged for some time in acquiring central Kentucky light, power, water, gas and electric railway plants in a large number of towns, is said to be planning the construction at Winchester, Ky., of a $1,000,000 power plant designed to furnish power to a number of the company's plants in neighboring towns. W. P. Hacket is in charge of the company's plants at Winchester and Mt. Sterling, and confirms the report that large improvements are to be made.

J. W. Adams, Chattanooga, Tenn., has purchased of W. C. Houston, Nashville, Tenn., the electric light plant at South Pittsburg, Tenn., and considerable improvements are planned, among which are the extension of day and night service to the town, and the building of an electric railway between South Pittsburg and Richard City, Tenn. A 100-horsepower engine is to be installed for temporary use, but power is to be procured ultimately from the Tennessee Power Co., Parksville, Tenn., in connection with complete transmitting equipment which is to be installed in the South Pittsburg plant.

Machine Tools

The Southern Veneer Mfg. Co., Louisville, Ky., is in the market for a grinder to be used in edging the files used in its plant.

The Weirton Steel Co., Weirton, W. Va., recently organized, is actively figuring on considerable plant equipment. Negotiations have been opened for a 30-ton standard crane.

Power and metal working machinery will be required in the plant to be erected at Louisville by the recently-incorporated Kentucky Metal Products Co., organized by Owen Tyler and others. The company will manufacture steel buckets, pipes and other similar lines.

Miscellaneous Machinery

The Columbia Plate Glass Co., Blairsville, Pa., is in the market for a 10-ton standard crane.

The Crucible Steel Co. of America, Pittsburgh, is in the market for one 10-ton standard crane for installation in La Belle Works, Northside, Pittsburgh.

The Westinghouse Airbrake Co., Pittsburgh, is in the market for five standard cranes of 5 and 10-ton capacities for installation in its foundry at Turtle Creek, Pa.

The Pittsburgh Crucible Steel Co., Pittsburgh, has received bids on 23 electric cranes of miscellaneous type. Cranes will vary from 5 to 30 tons in capacity. Considerable interest was attached to this inquiry, one of the largest of its nature to come out for some time. Awards probably will not be made until the early part of next year.

New Buyers

O. H. Watkins and F. J. Fisher have purchased a machine shop at Kenosha, Wis., from Oley & Hunter.

The Briggs-Chicago Mfg. Co., Chicago, incorporated with a capital stock of $60,000, by F. C. Wilcox, M. A. Preston and A. G. Dicus, will manufacture machinery.

The Chicago Economy Machinery Co., Chicago, has been incorporated with a capital stock of $25,000 by Patrick J. O'Brien, Arthur W. Dixon and Joseph Burke.

A Pennsylvania charter has been issued to the Erie Steel Construction Co., Erie, Pa., capital $30,000. The incorporators are Guy H. Strayer, William Cleveland Hoff and William Earl McCarey, all of Erie.

The Herdy Mfg. Co., manufacturer of motorcycles, has rented factory buildings on the corner of John and Mercer streets, Toronto, and will begin manufacturing about the end of December, employing 100 men.

The Petro-Haul Mfg. Co., Chicago, Ill., has been incorporated with a capital stock of $150,000, by H. Bierman, H. Ploeg and F. E. Schmuck, and will manufacture gas engines and agricultural implements.

The recently incorporated Roberts Mfg. Co., New York, will establish a rubber goods manufacturing plant at Trenton, N. J. The company is capitalized at $1,000,000 and is headed by Frederick T. Roberts, Trenton.

The partnership consisting of G. Edward Smith and William H. Hansell, trading as Smith & Hansell, and the Philadelphia Iron Foundry, Philadelphia, Pa., has been terminated by mutual consent and a new corporation formed to be known as Smith & Hansell, Inc.

Lecky & Collis, Ltd., Ottawa, Ont., will deal in railway, mining and contractors' machinery and supplies. It has a capital stock of $50,000 and has been incorporated by William Stanley Lecky, William Robertson Rowatt, Charles J. R. Bethune, Norman G. Larmonth and Philip H. Chrysler, all of Ottawa.

The Green Bay Casket Lowering Device Co. has been organized at Green Bay, Wis., and incorporated with an authorized capital of $20,000, by Albert Hoslet, Arthur Libert and F. J. Jonet. Plans are now under way for the establishment of a plant for the manufacture of devices for burial purposes.

The Inventor's Machinery Co., Ltd., Ottawa, Ont., will have a capital of $40,000 and the following incorporators: Maurice Alexander, Darley B. Smith, Alfred LaBelle and Jean Gustave Mignault, all of Montreal; and Jennie Louise Lawrence, Westmount, Que. It will manufacture all kinds of machinery and hardware specialties.

Articles of incorporation for the Detroit Motor & Machine Co. have been filed in Lansing, Mich., by Hal H. Smith, Frank W. Blair and H. J. Hayes. The company is capitalized at $150,000. It has been operating a machine shop for several years. The new incorporation marks a partial

change in ownership, as well as an increase in capital stock.

National Wire Products, Ltd., Montreal, Que., has been incorporated at Ottawa, Ont., to carry on the business of iron master, wire and steel maker and converter, miner, smelter, engineer, etc. It is capitalized at $1,500,000, and has the following incorporators: George Vipond Cousins, Ida H. McKerracher, Winnifred Evelyn Patch, Patrick Francis Brown, William Reuben Ford, all of Montreal.

Incorporation papers have been secured by the Hopewell Co., Reading, Pa. The purpose of the company is the mining of ores and their conversion into finished products. The company, which is capitalized at $20,000, was incorporated by A. M. Mumma, M. M. Gledhill and J. H. Gledhill. The company is engaged in operating the old Warwick mines near Reading, which are said to be turning out 100 tons of ore a day.

A plant will be erected in St. Louis, by the Oil Fuel Equipment Co., which was recently incorporated for $100,000, to manufacture oil-burning devices. An option has been secured on a factory site. Stockholders of the company are: Adolph A. Kreiger, Adolph Tacchella, Jacques Steiger, O. E. Bercheck and John McLean. The oil-burning device is the invention of Mr. Tacchella, who has gone to St. Louis from Germany.

The Williams Mfg. Co., Montreal, Que., with a capital stock of $1,000,000, has been incorporated at Ottawa, Ont., and will manufacture and deal in sewing machines, typewriters and other metal manufactures. Its incorporators are: Charles Wesley David, president; Bartlett McLennan, James Rodger, Francis McLennan and William Yuile, Montreal; Alexander Langlois and Charles Arthur Tutton, Plattsburg, N. Y.

Magnesia Products, Ltd., Montreal, Que., has been incorporated at Ottawa, Ont., to smelt, refine and dress minerals of all kinds, and to buy, sell and manufacture plant, machinery and implements. It will have a capital stock of $800,000 and the following incorporators: Andrew Ross McMaster, Westmount, Que.; Talbot Mercer Papineau, August Angers and John Kerry, Montreal, Que.; and Gertrude Harriet Flawn, Outremont, Que.

John Round & Son, Ltd., Montreal, Que., has been incorporated at Ottawa, Ont., with a capital stock of $500,000 to manufacture and deal in electro-plated and other plated goods and steel cutlery of all kinds, electric fixtures, etc. The incorporators are Messrs. John Ross Somers McLernon, manager, Arnold Wainwright, Maurice Alexander, Darley B. Smith and Jean Gustave Mignault, all of Montreal.

A shoe manufacturing concern to be known as the C. H. & B. Shoe Co., with a capital stock of $350,000, is in process of organization at Louisville, Ky., by former Mayor James F. Grinstead, Asa, J. L. and J. D. Harned, of the Louisville Clothing Co.; Hardin Wilson, H. C. Bruner, John Keebler and J. O. Carter, all of Louisville, and the erection of a good-sized factory, fully equipped in every respect, is planned immediately after the details of organization have been completed.

The Scallan Supply Co., 122-124 West Second street, Cincinnati, recently incorporated, advises that its business is the jobbing of factory, mill, mine and railroad supplies. The only manufacturing it does is in its fire apparatus department, which includes Scallan fire apparatus, such as Scallan extinguishers, hose, racks, etc. The company is also selling agent in the Cincinnati territory for the Ehret Magnesia Mfg. Co., Philadelphia, and carries a full line of pipe covering.

The Chattanooga Iron & Coal Corporation has been granted a charter by the secretary of state of Tennessee. The company is a reorganization of the Chattanooga Iron & Coal Co., which operates the Chattanooga furnace at Chattanooga, Tenn. The capital is $2,500,000. The purpose of the company, as stated in the application for a charter, is to conduct a general mining and manufacturing business. The incorporators are C. E. Buek, H. R. Lacey, Alex W. Chambliss, A. Shalliday and John A. Chambliss.

The New Foundry & Mfg. Co., Sioux City, Ia., advises that it has succeeded to the business of the Sioux City Foundry & Mfg. Co. Its officers are: President, D. C. Shull; vice president and secretary, C. M. Stillwell; treasurer, E. Root. The lines of the old company will be continued, which comprise the manufacture of the Norfolk hot air furnace, the Sioux City farm tractor and general jobbing business in structural steel and gray iron castings. The company is not contemplating adding to its plant at the present time and is not planning on adding new equipment.

A corporation under the name of the Century Iron Works, New York City, has been formed as an enlargement of a partnership successfully conducted for several years by Abraham Ratner, formerly with the Sexauer & Lemke Iron Works, Astoria, L. I., and of the H. H. Uris Iron Works, of New York City, and by Jacob Ment, formerly with the Sexauer & Lemke Iron Works. Joseph Terr, a civil engineer formerly in the service of the federal government, and of the city of New York, and Jacob Terr, have been admitted to the business. The present quarters at 49-51 West 140th street having proven inadequate, the corporation has leased a two-story and basement building, 50 x 80 feet, at 629 to 631 Concord avenue, and the adjoining vacant lots, 50 x 150 feet, at 151st street and Concord avenue. It is proposed to establish an up-to-date plant for the manufacture of light iron work. The officers elected are as follows: President, Abraham Ratner; vice president, Jacob Ment; secretary, Joseph Terr; treasurer, Jacob Terr. Mr. Ratner will be in charge of the estimating and general management, Mr. Ment of the plant and inside management and Joseph Terr of the engineering department and office.

Water Works

Council at Toledo, O., has approved an ordinance providing for a $150,000 bond issue to pay for the improvements now under way at the Broadway pumping station of the waterworks department. A 15,000-gallon pump, to cost $82,999, is now being installed. A crane to be used for repairing machinery will be installed at a cost of $12,800, and valves and fixtures for the pump will cost $14,400. The buildings are being remodeled to make room for the new machinery.

New Incorporations

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following companies have filed articles of incorporation:

Tinius Olsen Testing Machine Co., Philadelphia, capital $100,000, incorporated by Tinius Olsen, Thorsten Y. Olsen and H. W. Boyd, Philadelphia.

Economy Foundry Co., Ltd., Winnipeg, Man.; capital $100,000; by Wm. J. McMartin, Wm. Richardson and others.

Radcliff Saw Mfg. Co., Ltd., Toronto; capital $40,000; provisional directors, Francis Watt, Thomas M. Mulligan and Morley P. Van der Voort.

The Canadian & Messabe Iron Co., Ltd., Fort Frances, Ont.; capital $250,000; to mine and smelt ores, etc.; provisional directors, Olaf C. Damm, Leonard H. Nord, David C. McKenzie.

The Canadian Heer Engine Co., Ltd., Winnipeg, Man.; capital $100,-

000; by Hon. Hugh Armstrong, Roderick McLennan, George Bull and others.

Sixth City Machine Co., Cleveland; $10,000; Ray C. Skeel, Charles M. Ringle, Charles F. Bruggemeis, Elsie M. Backer and Arthur F. Goldenbogen.

The Motor Starting Co., Akron, O., motors, automobiles and supplies; capital stock $25,000; H. A. Woods, H. Paul, A. M. Tschanzt, E. W. Paul, C. L. Dinsmore.

Hoke Tractor Co., South Bend, Ind.; capital stock, $50,000; to manufacture traction engines; directors: John I. Hoke, Oscar C. Chambers and Lynn I. Hoke.

Foreman Motor & Machine Co., Ltd., Toronto; capital $40,000; provisional directors, George H. Foreman, Wm. J. Brown and Thomas H. Sharp.

The Gilbert Motor Boat Co., Ltd., Brockville, Ont.; capital $100,000; provisional directors, Frederick R. Gilbert, James E. Lowey, Samuel J. Kirkpatrick and others.

Sintered Ore Co., Inc., of Manhattan, N. Y.; iron ore, steel, pig iron and other metals; $80,000; David Dows, Wm. H. Mills and Nils V. Hansell, of Cauldwell, N. J.

Standard Tube & Fence Co., Ltd., Woodstock, Ont.; capital, $200,000; to manufacture metal tubing and fencing; provisional directors, James L. Hossack, Charles Jones, Henry A. Little and others.

Harring-Ford Pick & Tool Co., Inc., of New York; tools, mechanical devices; $50,000; I. Ross McCombe, Alice L. Hartford and George S. Wing, of 477 West 140th street, New York City.

Bellevernon Coke Co., Pittsburgh, capital $40,000, incorporated by John H. Hillman Jr., Pittsburgh; Holmes A. Davis, Wilkinsburg, Pa., and W. W. Parshall and W. H. Wilkey, Uniontown, Pa.

Metals Reduction Co., Inc., Manhattan, N. Y.; general dealer in metals, etc.; capital, $10,000; Fredk. H. Schaufler, Manfred E. Bolte, 7 East Forty-second street, New York City; Frank K. Barton, Richmond, S. I., N. Y.

The Worthmore Washing Machine Co., Toledo, O.; manufacturing and dealing in washing machines, motors, appliances and supplies; $10,000; 400 shares of $25 each; Frank M. Sala, Arthur J. Richie, E. M. Sala, F. A. Carabin and Fred N. Alexander.

Standard Structural Steel Co., Inc., Buffalo; manufacture all kinds of structural iron and steel; $15,000; incorporators, Moses L. Wallens, 239 Cedar street; Ethel Rubenstein, 403 North Division street; Pasquale L. Cimini, 47 Niagara street, Buffalo, N. Y.

Manchester Iron Works, St. Louis, Mo.; Gottfried Schmidt, Hugo T. Bofinger, Christina A. Schmidt, trustee for George Juenger, Christina A. Schmidt, John F. Wolf Sr., Jacob F. Wolf (last two mentioned are from St. Charles, Mo.); to manufacture, buy, sell and deal in structural, architectural and all other kinds of iron work; also to erect same as part of building; capital stock $10,000, of which $7,600 are subscribed and paid up.

General Industrial

The Standard Pump & Engine Co., Cleveland, has increased its capital stock from $25,000 to $100,000.

Operations have been begun by the Nehring Insulated Wire & Mfg. Co., Sycamore, Ill. The company will make insulated wire.

An effort is being made by the Michigan Central railroad to secure the New Process Steel plant, at Jackson, Mich., for use as shops.

An increase in capital stock from $300,000 to $400,000 has been made by the Ironton Portland Cement Co., Ironton, O.

Following an order of the trustees, the plant of the Streator Metal Stamping Works, Streator, Ill., has been closed.

The Semet-Solvay Co., Lebanon, Pa., began last week, the operation of 30 additional ovens at its Lebanon furnace plant. The entire 90 ovens of the company are operating.

The Gardner Axle works at Carlisle, Pa., is enjoying a good run of orders and making shipments over a wide area. The plant has had a busy autumn.

The Lalance & Grosjean tin plate mills at Harrisburg, Pa., will have a very short shut-down, if any, at the holiday season. The mills have been running full time for months.

The navy department has contracted with the Platt Iron Works, Dayton, O., to build a large number of special air compressors for the new warships covered by recent appropriations.

The Poland Coal Co., House building, Pittsburgh, has recently ordered four 150-horsepower boilers to be installed in the power plant of its new works in Greene county, Pa.

The old Light rolling mill plant at Lebanon, Pa., is being dismantled. It has been out of operation for several years and was recently sold for $47,000 for the benefit of bondholders.

Sale of properties of the St. Joseph Street Railway, Light, Heat & Power Co., St. Joseph, Mo., has been made by E. W. Clark & Co., Philadelphia, to Henry L. Doherty & Co., New York.

The Sta-Rite Engine Co., of La Crosse, Wis., manufacturing gasoline engines in various sizes, has increased its capital stock from $200,000 to $250,000 to provide for expansion of the business.

The Thomas Carlin's Sons Co., River avenue, Pittsburgh, recently has taken orders for two 7-foot stationary bottom type pans for grinding emery, and for a No. 18 lever shear for the Simonds Mfg. Co., Lockport, N. Y.

The third battery of the Didier coke ovens, near South Bethlehem, Pa., has been placed in operation, making a total of 225 now in operation. The officials of the Bethlehem Steel Co. declare themselves pleased with the results.

The Standard Mfg. Co., Pittsburgh, has absorbed the Northwestern Pipe & Supply Co., Erie, Pa. J. E. Fitzgerald, until recently connected with the Duquesne Sanitary Mfg. Co., Pittsburgh, is in charge of the Erie supply company.

The Canada Machinery Corporation, Ltd., has just completed the re-arrangement of its finances. The company will now have a total capitalization of approximately $1,210,000—all common stock, and expects to be able to announce a distribution to shareholders in the near future.

Counsel for the receivers of the Diamond State Steel Co., Wilmington, Del., are expected to make application about the middle of December for a hearing in federal court on the report of Special Master Mehaffy and the exceptions that have been filed to it.

The New Castle Steel & Iron Co., New Castle, Pa., which recently took over the New Castle Forge & Bolt Co., that city, has begun to overhaul the old plant. It is officially announced that it is not known at this time whether additional equipment will be needed.

The Shaw-Kendall Engineering Co., Toledo, O., has purchased the plant it occupied under a lease, for the sum of $69,217. The purchase includes the large factory building and the site facing on both Superior and Huron streets. Improvements will be made later.

The contract for furnishing to the Girls' High school, Louisville, Ky., a 1¾-kilowatt 110-volt direct-current generator, and the three horsepower 220-volt, 60-cycle alternating current two-phase motor to which it is to be direct connected, and other electric equipment required in the physics de-

partment of the school, has been awarded to Childers & Waters, Louisville.

The puddling mill of the Wilkes Rolling Mill Co., Sharon, Pa., has resumed work, according to advices from Sharon. The mill has been idle for the past two months, the efforts made to resume being held back for the past few weeks because of the inability to secure coal.

With assets of $14,934.99 and liabilities of $13,021.21, the Arthur R. Moore Sheet Metal Co., Oklahoma City, Okla., has filed a voluntary petition in bankruptcy in the federal court of Guthrie, Okla. Silos were the principal article manufactured by the company.

Improvements costing $25,000 are being made by the Reading Iron Co., Reading, Pa., at its plant in the locality of Seventh and Laurel streets, which include a dipping plant and a $20,000 addition to the pipe mill. All departments of the company in Reading and Danville, Pa., are operating full, with the exception of the Keystone furnace.

The Maxwell-Briscoe Motor Co., South Auburn, R. I., which figured in the recent receivership proceedings against the United States Motor Co., has closed its plant and has notified its 100 employes that their services are not longer required. The company is shipping its equipment to New Castle, Ind.

The Morris Iron Co., Frederick, Md., founder and machinist, advises that it is installing a Willis steel converting plant with a capacity of 60 tons per day and is enlarging its plant to about twice its present size. It is also installing more traveling cranes and all necessary equipment. The company will make a specialty of high grade steel castings.

H. L. Phillips, Youngstown, O., has been appointed receiver of the Youngstown Sashweight & Foundry Co., that city. The action follows the filing of a petition of involuntary bankruptcy against the company by the Canal Iron & Steel Co., Cleveland, a creditor. Gomer Jones, Girard, O., is president of the Youngstown company.

Announcement is made of the reorganization of the Lebanon Chain Works, Lebanon, Pa., with a capital of $150,000. Operation of the extensive plant will be resumed this week after an idleness of two years. The officers are: President, Thomas Evans; vice president, Eli Atwood, and general manager, H. T. Atkins, all of Lebanon.

Hobart Scott has been appointed receiver for the Heisler Co., Toledo, O., manufacturer of pumping engines and air compressors. It is understood the assets are ample to meet all liabilities. The establishment will be operated under the receivership pending a reorganization. Oil engine orders on hand will keep the plant busy until July.

The Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., reports that it has all of the orders it cares to take at this time, although it has not attempted to sell the entire output for the first half of 1913. The plant has been exceedingly busy since April 1 and seven weeks ago ceased taking orders for this year's delivery. The special departments have a large amount of business on hand.

William M. Crockett has been appointed receiver for the Lafayette Safe & Lock Co., Lafayette, Ind., which has one of the largest safe works in the state. John J. Schultz, secretary of the company, asked that a receiver be appointed. The company had apparently been doing a large business and extensive enlargements to the plant were recently made.

The Joseph L. Skeldon Engineering Co., Spitzer building, Toledo, O., has secured the contract for the installation of machinery in the new steam power plant of the A. L. Garford Co., Elyria, O. The contract price for the installation of machinery is approximately $15,000. New buildings being erected at the plant were designed by the Mills, Rhines, Bullock, Bellman Co., Toledo.

Among the important contracts recently completed by the Manitoba Bridge & Iron Works, Ltd., Winnipeg, Man., are the Osborne bridge, an addition to the National Transcontinental railroad shops at Transcona and the Canadian Northern railroad shops at Fort Rouge. The firm is now engaged on Canadian Pacific railway bridges in the western division of the road.

The Loucks Iron & Steel Co., Roanoke, Va., will be sold to a company of Pittsburgh capitalists, according to advices from the Loucks company. The works were first put in operation in 1892 and modernized in 1906. The company manufactures ingots, muck bar, rerolled T-rails, from 8 to 25 pounds, merchant bar iron, bands, etc. W. H. Fetter, Scottdale, Pa., is president.

A charter has been granted by the state of Wisconsin to the Marinette, Tomahawk & Western Railroad Co., which owns and operates about 60 miles of steam railway in Lincoln county, Wis. The headquarters are at Tomahawk, Wis., and R. B. Tweedy, of that city, owns a majority of the capital stock of $250,000. Mr. Tweedy recently bid in the property at receiver's sale.

The Broughton Bolt & Nut Co.'s plant, Elyria, O., which was recently purchased by the Lebanon Valley Iron & Steel Co., Lebanon, Pa., will be razed immediately and moved to the latter place. The machinery and equipment is practically new and will be installed in the building now in the course of construction. H. H. Light, president of the company, plans to place the new plant in operation by Jan. 1.

The board of water commissioners, La Crosse, Wis., has awarded contracts for the construction of the new waterworks extension plant, to cost $500,000. Among the awards are: Water mains, United States Cast Iron Pipe Co., $14,690; interior pipe, John R. Keehn Co., Chicago, $7,770; valves, Chapman Valve Co., Chicago, $2,245; stack, Weber Chimney Co., Chicago, $2,475; pumphouse and supplies, La Crosse Construction Co., $50,834.

The Merrimac Iron Foundry and the Australian Mfg. Co. have been consolidated under the name of the Merrimac Foundry & Machine Co., Lawrence, Mass. The latter company acquires the assets, and assumes the obligations of the merged concerns. The facilities have already been largely increased, and additional capital invested, which will enable the company to handle much more business than in the past.

J. Albert Hughes has been appointed receiver for the Thomas C. Basshor Co., Baltimore, machinist and structural iron worker. In a complaint filed by C. Hazeltine Basshor, it is stated that the immediate cause of the action was a decree for $21,000 obtained against the company last July, by Edward C. Carrington Jr., receiver for the Hammond Ice Co. Assets are given at about $270,000 and liabilities about $130,000.

An installation of 5-ton acid openhearth furnaces has been made by the Penn Steel Castings & Machine Co., Chester, Pa., in its No. 2 foundry. The furnaces replace the Tropenas converters, which have been dismantled. The company announces that it is better equipped now than ever to produce small steel castings of either carbon or special alloys, and is thus enabled to make prompt shipments.

The Gate City Light, Heat & Power Co., Gate City, Va., has purchased of the James Clark Jr. Electric Co., Louisville, Ky., a 50-kilowatt 2,300-volt generator, alternating current, for use in its plant at Gate City, and the Eureka Cotton Mills, Englewood,

Tenn., have contracted for a similar generator for direct current. The James Clark company has recently filled a number of orders from England for the electrically-driven machine tools which it manufactures.

An increase of 100 per cent in the output of steel cars is the result expected by the Norfolk & Western Railway Co. from the improvements to its shops at Roanoke, Va. In a statement issued from the president's office, it is said that the facilities of the Roanoke shops will be extended, increasing the output of new cars to about 20 per day, against the 10 cars turned out at the present time. The improvements are estimated to cost about $250,000. The Virginia Bridge & Iron Co., which has been fabricating the bodies of the steel cars, will continue that work.

New buildings, machinery and cars to the extent of $30,000, are to be added to the equipment of the Jennison & Wright Creosoting Co.'s plant at Broadway avenue and the Wabash railroad, Toledo, O. Contractors are now at work on the buildings which will practically double the plant. Contracts for $8,000 worth of new machinery have been placed with the Joseph L. Skeldon Engineering Co., Toledo. The Jennison & Wright company, which treats wood for railroad ties and other construction materials, has been in existence for about two years.

The Baltimore Malleable Iron & Steel Casting Co., Charles and Wells streets, Baltimore, is making other improvements to its plant as well as an addition to the foundry, previously mentioned. These improvements consist of a new shipping room, the enlarging of the tumbling and annealing rooms and the installing of all new equipment; a new 20-ton melting furnace and a new power plant, with producer gas equipment, which supplies current to run the mills, elevators, fans and blowers, with direct motor system. A complete trolley system throughout the yard for handling material is also being put in.

Former Gov. B. B. Comer, of Alabama, and associates have purchased of the Walsh & Weidner Boiler Co., Chattanooga, Tenn., for use in their cotton mill which is under construction at Sylacauga, Ala., 1,500 horsepower of horizontal tubular steel-incased setting boilers, in six 250-horsepower units. The same company has also recently sold similar equipment to the Davis Hosiery Mills, Chattanooga, and to the Grove Park Inn, Asheville, N. C., and has shipped to its agents at Manila, P. I., four of its large boilers for installation in a sawmill which is being erected near the Philippine capital.

Considerable interest is being taken in the large reversing engine for the Youngstown Sheet & Tube Co., Youngstown, O., being built by the Mesta Machine Co., Pittsburgh, at its works at West Homestead. When completed, this engine will weigh approximately 1,300,000 pounds and will be one of the largest engines of its kind in the country. When operated at maximum speed, the engine will develop about 3,500 horsepower. It will be used in connection with the operation of the blooming mill. This is the engine for which two large bed plates were made, the casting of which required about 260,000 pounds of metal each.

The Vincent-Alward Co. is the new title of the corporation formerly known as the Windsor Spring Co., of Kenosha, Wis., which was sold to W. W. Vincent and V. Lee Alward several months ago by the estate of B. F. Windsor, founder of the company. The former corporate name was continued until the new owners had completed all details of the reorganization. Many important changes have been made in the factory, which produces springs for beds, seat cushions and other purposes. Enlargement will continue through the winter, the volume of orders already on hand making expansion necessary and imperative at once.

An additional battery of 12 gas producers is being added by the United Steel Co., Canton, O., to its present battery of the same size, giving the company 24 in all. The use of natural gas for fuel will not be altogether discontinued, but the company is putting its plant in shape to use other fuel. The general contract was awarded to the S. R. Smythe Co., Pittsburgh, and the Kittoe Boiler & Tank Co., Canton, is building the shells and flue work. The work has been practically completed. The producer plant of the company is being remodeled in order to bring the entire plant up to date. Fuel oil is also used by the company.

The Mineral Products Co., of Rhinelander, Wis., manufacturing metal clad stone vaults and other sheet metal products, has decided to move its works and general offices to Fond du Lac, Wis. About $15,000 will be expended in equipping the new works at 86-90 South Brooke street. It was at first intended to move to Chicago, but Fond du Lac capital induced the concern to move to that city. A. W. Brown is president; F. E. Fitzpatrick, vice president; R. A. Riek, secretary, and J. M. Thompson, general manager. The company owns valuable patents in the United States and Europe for designs, molds and machinery employed in its business.

Fred C. Gardner, receiver for the Atlas Engine Works, Indianapolis, Ind., has been ordered by the court to distribute the money in his possession and wind up the receivership. He has about $84,000, of which merchandise creditors will receive their accounts in full, amounting to $63,459.89. The receiver and his attorneys are allowed $20,550.92 for their services. The receiver reports that the purchase of the plant has satisfied debts secured by pledges of the Atlas Engine Works accounts amounting to $48,187.04; has satisfied a debt of $105,000 secured by a bond issue; a judgment of $6,500 against the Atlas company and has paid interest amounting to $31,500 due on a bond issue of $1,050,000.

The Electric Furnace Co. of America, manufacturer of Bailey electric furnaces, represented by R. M. Rush, Oliver building, Pittsburgh, officially advises that it has closed a contract with the Perfection Spring Co., Central avenue, Cleveland, for the exclusive right to use the Bailey furnace in the automobile spring industry. The Cleveland manufacturer has closed negotiations for the installation of a 100-kilowatt furnace and probably will order additional furnaces in the near future. The Electric Furnace company has taken orders for the installation of a 150-kilowatt furnace for heating billets in the forging plant of the Dodge Bros. Co., Detroit, and two 100-kilowatt furnaces in the forging plant of the Canton Drop Forge Co., Canton, O. A low-pressure turbine is being installed in this plant to operate on exhaust steam from the forging hammers to supply current for furnaces.

The special committee of the Watertown (Wis.) Advancement Association to investigate the advisability of establishing a malleable iron plant at Watertown, has reported that it recommends the enterprise and believes it would be a safe and profitable investment for Watertown capital. The committee visited Milwaukee, Beaver Dam, Rockford and other cities and states in its report that the malleable iron industry is today one of the leading factors in the iron world and the business has assumed tremendous proportions with a constantly increasing demand. Every plant visited was operating to utmost capacity and business was being turned away daily for lack of capacity. In every case a crying need of help was referred to. The committee rec-

ommends the establishment of a plant involving an investment of between $75,000 and $100,000. Otto Biefield is chairman of the committee. The association has as yet taken no definite action.

In connection with construction work at its plant, the Youngstown Sheet & Tube Co. has let the following recent contracts: To the Southwark Foundry & Machine Co., one turbo-blower for Bessemer steel plant, normal capacity, 40,000 cubic feet of air per minute, 27 pounds maximum, 45,000 cubic feet air per minute, 30 pounds; to the Mesta Machine Co., one 14 x 36-inch dry pump, one 108-inch type "B" Helander condenser, capacity 90,000 pounds steam per hour; to the Babcock & Wilcox Co., eight B. & W. superheaters for Rust boilers at furnace "D;" to the Dravo Contracting Co., concrete construction for No. 10 pump house intake; to the Morgan Engineering Co., Alliance, O., one 10-ton, 63 feet 2 inches span, crane, sheet mill warehouse, and one 200-ton duplex stripper crane, No. 2 blooming mill; to the Cleveland Crane & Engineering Co., one 10-ton 45-foot span crane, sheet mill paint shop; to Dravo Doyle, two two-stage 12-inch DeLaval centrifugal pumps, 5,000,000 gallons capacity, 145-foot head, one single-stage 24-inch DeLaval centrifugal pump, 22,000,000 gallons capacity, 50-foot head, all three pumps motor driven, 250 horsepower.

The former plant of the Wheelock Engine Co., Worcester, Mass., which was recently purchased by the Wyman & Gordon Co., that city, has been transferred to the Whitcomb-Blaisdell Machine Tool Co., in return for the deeding by the latter company, of its foundry plant and about 4,000 square feet of land in Gold street, to the Wyman & Gordon Co. The property comprises 90,000 square feet of land assessed for $11,300, with the buildings assessed for $10,000. The plant has been idle since the International Power Co. took over the Wheelock Engine Co. several years ago. The Whitcomb-Blaisdell Machine Tool Co., manufacturer of machine tools, will remove its foundry business to Southgate street and erect a building twice as large as its present plant. Charles E. Hildreth, of the company, states that the proposed new building will be about the size of its present foundry. The company's machine shop will be maintained in Gold street. The Wyman & Gordon Co., manufacturer of forgings, will use the main foundry acquired by the exchange and will also erect a building which will increase its present plant by one half. George F. Fuller, of the Wyman & Gordon Co., states that the proposed new plant will cost from $60,000 to $75,000, and will be an extension to the present forge shop. The purchase will give the company more room for the handling of its increasing crank shaft finishing business, for which more buildings may be required later. The exchange enables both companies to erect buildings nearer to their present plants.

Bridge News

The city of Calgary, Alta., has adopted a by-law to raise about $1,000,000 for the construction of a high level concrete bridge over the Bow river, and two smaller concrete bridges.

An $80,000 contract has been let by the Canadian government to the Canadian Bridge Co. for the construction of steel bridge work over the Managuish river and Canyon creek, on the line of the National Transcontinental railway.

The contractor for the superstructure of the large bridge which the Dominion government is building across the St. Lawrence river above Quebec is the St. Lawrence Bridge Co., a union of the Dominion Bridge Co., Lachine, and the Canada Bridge Co., Walkerville, Ont. W. P. Ladd, Walkerville, will be superintendent of manufacture and has already been overseeing the building of the company's vast shops which are now near completion and are situated near Montreal. The completed shops of the new bridge company will represent an outlay of over three-quarters of a million dollars. A start will be made on the bridge shortly after the first of the coming year, and while little but temporary work can be done next year at the bridge site, all preliminary work will be completed. William B. Fortune, who has had extensive experience in erecting large bridges in the United States, has been appointed general superintendent in charge of the construction of the St. Lawrence bridge.

Miscellaneous

The Carnegie Steel Co. has recently purchased a 10-ton electric crane for installation in its warehouse at Baltimore, Md.

The Wheeling Sheet & Tin Plate Co., Wheeling, W. Va., has ordered five 15-ton and one 5-ton electric cranes, equipped with Westinghouse motors.

The plans for the new mechanical filtration system to be installed by the city of Ottawa, Ont., include about $90,000 worth of 72-inch steel pipe and a steel bridge from Lemieux island in the Ottawa river to the mainland to cost $30,000.

The Harrisburg Mfg. & Boiler Co., Harrisburg, Pa., has just completed the shipment of the last of three 4,000-horsepower water wheels for the Panama canal locks. The wheels, penstocks and other parts were sent from the works by special train.

The capacity of the Louisville (Ky.) Water Co.'s pumping station has been increased 30,000,000 gallons a day by the addition of a 1,500-kilowatt Curtis turbo-generator, furnished by the General Electric Co., Schenectady, N. Y. The pump operated by the turbine was furnished by Henry R. Worthington, Louisville.

The Hartman-Greiling Machine & Boiler Works, Green Bay, Wis., has received a contract from the United States engineer's office at Detroit for a floating steel derrick complete for service. The contract will keep the Green Bay works busy, as delivery is set for the date of the opening of navigation in 1913.

Trade Notes

The Anderson Engine Co. has changed the location of its principal office from Shelbyville, Ill., to Chicago.

Denial has been made by officials of the report that the Elwood Iron Works plant, Elwood, Ind., is about to be moved to Gary, Ind.

The D'Olier Centrifugal Pump & Machine Co., just organized, will succeed the D'Olier Engineering Co., 503 Morris building, Philadelphia. The latter is now winding up its old contracts.

The John McDougall Caledonia Iron Works Co., Ltd., Montreal, Que., has been appointed exclusive agent for Canada for the high speed steam engines built by Browett, Lindley & Co., Ltd., Manchester, Eng.

Fires

The plant of the Vance Boiler Works, Geneva, N. Y., sustained a loss of $50,000 by fire last week. The origin of the fire is unknown.

The shops of the Missouri, Oklahoma & Gulf railroad, at Muskogee, Okla., were damaged to the extent of $25,000, by fire recently. Two new locomotives were included in the loss.

The Nazareth Foundry & Machine Co.'s plant, Nazareth, Pa., was damaged to the extent of $10,000 by fire last week. The molds in the foundry were badly damaged. John A. Miller, of Nazareth, is president of the company.